

DEVELOPING GEOSPATIAL INTELLIGENCE STEWARDSHIP  
FOR MULTINATIONAL OPERATIONS

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MASTER OF MILITARY ART AND SCIENCE  
General Studies

by

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

## ABSTRACT

### DEVELOPING GEOSPATIAL INTELLIGENCE STEWARDSHIP FOR MULTINATIONAL OPERATIONS, by Jeffrey L. Thomas, 135 pages.

In recent years the contemporary operational environment has increasingly included multinational operations, which have fault lines in understanding and visualizing the common operational picture. These fault lines are typically associated with national caveats, over-classification, releasability and interoperability issues. This research of Joint, Interagency, Intergovernmental and Multinational respondents stated geospatial intelligence (GEOINT) must be properly planned, released and executed for multinational operations to be effective. Results indicate that a higher level of cognitive comprehension of GEOINT and its application is needed for multinational operations. This requires effective stewardship of GEOINT wherein all participants are charged with the responsibility to properly develop, utilize and safeguard GEOINT, including its people, its property and its financial assets to maximize the effectiveness for GEOINT cells and commanders. GEOINT stewardship is not tied to specific systems architecture. The GEOINT cell is therefore able to adjust to the evolving character of conflict in order to better frame the problem. GEOINT stewardship enables users to apply critical and creative visualization to situational understanding, and provide context and orientation to solve ill-structured problems. The GEOINT cell must train and exercise this stewardship through a shared vision that will enhance their capability to effectively address multinational GEOINT requirements focus internal and external research and development efforts, pursue economies in acquisition, and develop approaches to improve information sharing.

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## ACRONYMS

ABCA	American, British, Canadian, Australian, and New Zealand Armies Standardization Program
COP	Common Operational Picture
GEOINT	Geospatial Intelligence
ISO	International Standards Organization
ISP	Iraqi Security Police
ISR	Intelligence, Surveillance, and Reconnaissance
JMD	Joint Manning Document
MiTT	Military Training Team
NATO	North Atlantic Treaty Organization
NGA	National Geospatial-Intelligence Agency
SOIC	Stability Operations Information Center
SA	Situational Awareness
US	United States
USJFCOM	US Joint Forces Command

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## CHAPTER 1

### INTRODUCTION

The purpose of this study is to identify how geospatial intelligence (GEOINT) support for multinational operations can be made more effective. It is clearly understood that many coalition operations are limited by sharing and classification restrictions. Likewise, the recent wars in Afghanistan and Iraq, the 2006 Lebanon non-combatant evacuation operation and many global disasters have demonstrated a vital need to improve the way decision-makers understand and visualize multinational operations.

Military commanders and staffs start situation assessment by examining a map to clearly understand and visualize the contemporary operational environment.<sup>1</sup> To accomplish this successfully, the commander must have up-to-date GEOINT, an established intelligence discipline that supports joint forces in their ability to rapidly respond to threats around the world by providing geo-referenced visual and data products that serve as a foundation and common frame of reference for understanding and visualizing operations.<sup>2</sup>

GEOINT can be employed across the national, strategic, operational, and tactical levels of the contemporary operational environment. Military customers are generally the most vocal in stating that GEOINT is most useful at the tactical level. At the tactical level

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<sup>1</sup>Andy Sanchez, “Leveraging Geospatial Intelligence (GEOINT) in Mission Command” (Monograph, School of Advanced Military Studies, Fort Leavenworth, KS, May 2009), 1. <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA506270&Location=U2&doc=GetTRDoc.pdf> (accessed 8 May 2010).

<sup>2</sup>Chairman, Joint Chiefs of Staff, Joint Publication 2-03, *Geospatial Intelligence Support to Joint Operations* (Washington, DC: Government Printing Office, 2007), vii.

the locally produced report (i.e. value-added data) adds to the finished product's graphic intelligence and imagery. GEOINT technology is also advancing in government and private sectors to support business ventures and government agencies. Nevertheless, commanders often neglect GEOINT's proven methods, and may lump it into "buckets" comprising intelligence, surveillance, and reconnaissance (ISR), or other terrain products. Many military planners do not appreciate the important role that GEOINT can serve in visualizing and informing multinational operations. So what must be done to demonstrate the value of GEOINT in the planning and conduct of multinational operations? GEN Mattis, Commander, United States (US) Joint Forces Command and the North Atlantic Treaty Organizations (NATO's) Allied Command Transformation states that the best way forward for most legacy methods is to:

re-baseline our terminology and concepts by returning to time-honored principles, such as mission-type orders, unambiguous commander's intent, and clear articulation of ends, ways, and means that have been tested in combat and are historically grounded in the fundamental nature of war while incorporating, where logical, the issues introduced by today's more complex environment.<sup>3</sup>

In an increasingly complex international operating environment, how do we best re-baseline GEOINT? What are the time-honored principles? How do we apply unambiguous commander's intent? How do we apply clear ends, ways, and means for GEOINT? Re-baselining GEOINT requires stewardship; which may be defined as the responsibility to properly develop, utilize and safeguard GEOINT, including its people, its property and its financial assets to maximize the effectiveness for GEOINT cells and the commander. It is clearly understood that GEOINT requires people, is actual

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<sup>3</sup>James N. Mattis, "USJFCOM Commander's Guidance for Effects-based Operations," *Joint Forces Quarterly* 4th Quarter, no. 51 (October 2008): 107.

information property and has tangible financial value. Therefore, GEOINT must have stewardship.

### Thesis Intent and Primary Research Question

The primary research question for this thesis is, “How can geospatial intelligence for multinational operations be made more effective?” To address the primary research question, the following secondary questions must be answered:

1. How does GEOINT support decision makers in the contemporary operational environment?
2. What are the capabilities and limitations of GEOINT cells in providing understanding and visualization of the common operational picture?
3. Is GEOINT cell stewardship understood and practiced in multinational operations?

### Assumptions

The primary assumption in this research is that coalition operations and the global community require sharing to enable cohesive understanding and visualization for multinational operations. GEOINT has evolved significantly in recent years and 9/11 has altered the resource management model. The bulk of operations in the contemporary operational environment will require increasingly complex GEOINT support and resource management since tasks come from different multinational requirements and different national caveats.

As NATO leads many of these multinational operations, it will turn into an even-larger international alliance by gradually adding distant countries to its membership.

NATO will continue to be the world's foremost intergovernmental military alliance, even though there will be major transformation challenges. Even though NATO has specific limitations and particular growing pains, it is distinctly capable of meeting the burden of the contemporary operational environment and provides the command and control composition necessary for complex multinational operations. In comparison, the United Nations with its restructured composition and means are able to assume limited peacekeeping operations but the UN is restricted in command and control of more difficult peace support operations under chapter 6 of its Charter and is unable to undertake more difficult operations under its chapter 7.

What has definitely changed is the expectation for coalition members to take more responsibility for GEOINT support and to take charge of current and future operational environment support. These ever-challenging coalition operations require GEOINT stewardship--the responsibility to properly develop, utilize and safeguard GEOINT, including its people, its property and its financial assets to maximize the effectiveness for GEOINT cells and the commander.

### Definitions

For the purpose of transparency, key terms in this thesis are defined as follows:

Battle Command is the “art and science of understanding, visualizing, describing, directing, leading, and assessing forces to impose the commander’s will on a hostile, thinking and adaptive enemy (or threats).”<sup>4</sup>

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<sup>4</sup>Headquarters, Department of the Army, Field manual (FM) 3-0, *Operations* (Washington, DC: Government Printing Office, 2008), 5-2.

Combined/Multinational is an adjective used to describe activities, operations and organizations in which elements of more than one nation participate.<sup>5</sup> Joint/Multiservice is an adjective used to describe activities, operations and organizations in which elements of at least two services participate.<sup>6</sup> An alliance is a relationship “that results from a formal agreement or treaty between two or more nations or broad, long-term objectives that further the common interests of the members.”<sup>7</sup> In contrast, a coalition is “an adhoc arrangement between two or more nations for common action.”<sup>8</sup> A coalition action is a “multinational action outside the bounds of established alliances, usually for single occasions or longer cooperation in a narrow sector of common interest.”<sup>9</sup>

Common Operational Picture is a “single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative planning and assists all echelons to achieve situational awareness (SA).”<sup>10</sup>

Contemporary Operational Environment replaced the term battlespace. This term addresses both the current and future operational environments. The Contemporary Operational Environment is the overall operational environment that is current and in the

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<sup>5</sup>North Atlantic Treaty Organization, Standardization Agency (NSA), 2009, 2-C-9, [http://www.nato.int/nsa/nsa\\_home.htm](http://www.nato.int/nsa/nsa_home.htm) (accessed 8 May 2010).

<sup>6</sup>Ibid, 2-J-1.

<sup>7</sup>Chairman, Joint Chiefs of Staff, Joint Publication (JP) 3-16, *Multinational Operations* (Washington, DC: Government Printing Office, 2007), Glossary-5.

<sup>8</sup>Ibid., Glossary-6.

<sup>9</sup>Ibid.

<sup>10</sup>Chairman, Joint Chiefs of Staff, Joint Publication (JP) 3-0, *Joint Operations* (Washington, DC: Government Printing Office, 2008), Glossary-9.



near future, until year 2030. The range of multiple threats during this time extends across the full spectrum of conflict, from smaller, lower-technology, high intensity, to multiple, concurrent conflicts. A combination of any of these conflicts would be particularly challenging, and require adaptive solutions for these ill-structured problems.

Geospatial Intelligence (GEOINT). There is no universally acceptable definition for GEOINT (see the various national GEOINT definitions). Nearly every member of NATO defines GEOINT differently as each nation applies platforms, collection and exploitation to varying degrees. Not all NATO members define GEOINT as geospatial information, imagery intelligence, and imagery. Yet, the basic geospatial referenced collection requirements process (i.e. 2009 NATO acceptance of the National Image Interpretability Rating Scales) and exploitation (data formats, conflation, analysis, and migration) of geographically referenced activities on Earth is understood to be common. GEOINT data sources include imagery and mapping data, whether collected by commercial or government satellites, manned/unmanned aircraft, and ground-truthed (absolutely verified) by demographic (i.e. census, cultural intelligence) information, global positional systems waypoints, utility schematics, or any discrete data that have locations on Earth.

Geospatial Intelligence Stewardship is defined as the responsibility to properly develop, utilize and safeguard GEOINT, including its people, its property and its financial assets to maximize the effectiveness for GEOINT cells and the commander. GEOINT data is a resource that has established collection and exploitation processes, financial value, and legal oversights. A key focus of GEOINT stewardship is knowledge stewardship (akin to knowledge management), which includes the preservation, sharing,

and generation of old and new GEOINT knowledge regarding the contemporary operational environment. In order to accomplish this, GEOINT stewardship has three functions: to formulate GEOINT policy; to exert influence; and to collect and use GEOINT.

National caveats are national restrictions placed by nations on the use of national military forces operating as part of a multinational operation. These national caveats can constrain NATO commanders by limiting their flexibility in executing warfare. For this reason, the NATO seeks national contributions with as few caveats as possible.<sup>11</sup>

Stewardship is the conducting, supervising, or managing of an object, field or discipline; particularly the careful and responsible management of something entrusted to one's care. Applied as organizational stewardship, it refers to a leader's responsibility to properly utilize, develop, and share its resources, including its people, its property, and its financial assets, while still protecting the security of these resources. Similarly, the World Health Organization defines stewardship as, “the careful and responsible management of a well-being of the population, the very essence of good government.”<sup>12</sup>

### Limitations

There are many aspects of GEOINT that will not be addressed in this research. The vast majority of GEOINT research is on procedures and processes with robust

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<sup>11</sup>Vincent Morelli, Congressional Research Service Report for Congress, *NATO in Afghanistan: A Test of the Transatlantic Alliance*, 3 December 2009. <http://www.fas.org/sgp/crs/row/RL33627.pdf> (accessed 8 May 2010).

<sup>12</sup>World Health Organization, “Stewardship,” [http://www.who.int/health-systems-performance/sprg/hspa06\\_stewardship.pdf](http://www.who.int/health-systems-performance/sprg/hspa06_stewardship.pdf) (accessed 8 May 2010).

research and development. Consequently, this study is focused on how GEOINT support for multinational operations can be made more effective.

This research centers its attention on GEOINT stewardship with regards to complex, multinational environments. Research is focused on international, governmental and coalition GEOINT capabilities and limitations. One relevant multinational operation is selected to illustrate the effectiveness of GEOINT stewardship. This research focuses on the multinational GEOINT operations of those nations supporting multinational operations.

### Scope and Delimitations

This research is unclassified and includes joint and multinational GEOINT, GEOINT stewardship, and other tangible factors. It does not address the interagency dimensions, nor the ISR platform issues related to the requirements management processes. The interagency and ISR realm is discussed only as it serves to argue the practical use of multinational operations. This study will focus on a multinational operation that consists of air-land-sea operations, but will not delve too deeply into operational art.

When mentioning command and control, the objective is to discuss the overall means and not to discuss the command, control, communications, computers, intelligence, surveillance, and reconnaissance domain and related technological interoperability. Command and control will be discussed in terms of the human aspect of leadership and the aspect of stewardship.

It is clearly understood that coalition and mission partners protect their own higher national interests, impacts of sharing and releasability, and national caveats often

restrict what can be shared, thus resulting in a lack of coalition understanding and visualization. Finally, lessons learned from after-action-reports or from current operations are mostly classified and will not be included in this research.

### Significance of Research

The results of this research will contribute to raise the general comprehension of the intricacies of GEOINT stewardship and will help military planners assess the operational effectiveness of GEOINT support for multinational operations. The research will assist military planners in realizing that GEOINT support can be easily understood and coordinated, even in a dynamic, technologically inundated operational environment. Planners should recognize that multinational operations come together in different forms. Different nations are able to take on GEOINT leadership roles in the Contemporary Operational Environment. Together, these nations can achieve the unity of effort needed to execute the full spectrum of operations. This research offers mission-specific GEOINT ‘fitness’ metrics to assess the effectiveness of GEOINT stewardship. These metrics allow common friction points and risks to be mitigated, and should assist planners in resolving differences in understanding and visualizing multinational operations. In addition, the research may improve the content and applicability of the US Joint Publication, 2-03, Geospatial Intelligence Support to Joint Operations.

### Summary

Today, countries group together in a coalition of the willing to face global threats. In this multinational environment, it is important to accurately understand and visualize the input of all GEOINT capable coalition partners. Each may be critical to the success of

the multinational operation, and each has capabilities and limitations that must be understood. Thus, organizations are duty bound by the principles of GEOINT stewardship to the practice and responsibility of assuring decision-makers that GEOINT resources are properly utilized and developed. Chapter 2 comprehensively summarizes and evaluates the existing literature on battle command and the common operational picture, GEOINT, and stewardship with particular focus on multinational operations since 9/11.

## CHAPTER 2

### LITERATURE REVIEW

The purpose of this study is to identify how GEOINT support for multinational operations can be made more effective. The primary research question is: How can GEOINT for multinational operations be made more effective?

From chapter 1, the necessity of providing understanding and visualization of the operational environment to decision-makers should be apparent. Unilateral operations continue to take place, but rarely can one nation ever go it alone. Therefore, multinational coalitions are established in an attempt to allow the burden sharing among nations, reduce costs, and communicate international legitimacy. Importance is often placed on a regional nation because of its vicinity, knowledge, and ability to intervene and reconcile.

To address the primary research question, this chapter reviews the existing significant literature on contemporary operational environment, GEOINT, stewardship, and GEOINT cells. This chapter will not review the technical aspects of GEOINT, data format specifications, nor standards. It contains six main portions: governing multinational statutes; professional forums; doctrinal multinational publications; previous research; articles; and studies and theses that are pertinent to the research. This examination will permit a considerable section of the available information to address the three secondary questions stated in chapter 1.

#### Statutes

The US has four strategic mandated documents that shape the national contemporary operational environment vision: the 2006 *National Security Strategy*; the

2008 *National Defense Strategy*; the 2010 *Quadrennial Defense Review*, and the more current influential 2006 *Quadrennial Defense Review*; and the 2004 *National Military Strategy*.<sup>13</sup> Together, these documents provide a strategic framework and shape the doctrine, organizational, training, materiel, leadership, personnel, and facilities (DOTMLPF) for the defense services. In addition, these documents help the commander to understand the operational environment of various friendly, adversary, and neutral actions and how this impacts achieving the military end state.<sup>14</sup>

Many of our closest allies have developed similar guidance documents to influence the strategic vision of their defense forces and operational environment.<sup>15</sup> Australia's *Future Warfighting Concept* and *Defence White Papers* provides strategic and operational guidance of their operational environment.<sup>16</sup> In addition, the British *Strategic*

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<sup>13</sup>White House, *2006 National Security Strategy* (Washington, DC, March 2006). [www.strategicstudiesinstitute.army.mil/pdffiles/nss.pdf](http://www.strategicstudiesinstitute.army.mil/pdffiles/nss.pdf) (accessed 8 May 2010); Department of Defense, *National Defense Strategy* (Washington, DC: Government Printing Office, 2008), <http://www.defense.gov/news/2008%20national%20defense%20strategy.pdf> (accessed 8 May 2010); Department of Defense, *2009 Quadrennial Defense Review* (Washington, DC: Government Printing Office, 2009); Chairman, Joint Chiefs of Staff, *The National Military Strategy* (Washington, DC: Government Printing Office, 2004), <http://www.defense.gov/news/Mar2005/d20050318nms.pdf> (accessed 8 May 2010).

<sup>14</sup>Eric Springer, "Developing Security Forces Officers For The Future Operating Environment" (Thesis, Command and General Staff College, Fort Leavenworth, KS, 2009), 14, <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA502058> (accessed 8 May 2010).

<sup>15</sup>*Ibid.*

<sup>16</sup>Chief of the Defense Force, *Future Warfighting Concept*, 2003, <http://www.defence.gov.au/publications/fwc.pdf> (accessed 8 May 2010); Australian Government, Department of Defence, "Defending Australia in the Asian Pacific Century: Force 2030," White Paper, 2009, [http://www.defence.gov.au/whitepaper/docs/defence\\_white\\_paper\\_2009.pdf](http://www.defence.gov.au/whitepaper/docs/defence_white_paper_2009.pdf) (accessed 8 May 2010).

*Defence Review, Strategic Trends Programme 2007-2036*, 3rd ed., and Australian and British *Defence White Papers* specify the need for common approaches to contemporary operational environment adversaries.<sup>17</sup> In addition, they tend to lean on United States (US) strategic structures (EUCOM, CENTCOM, PACOM, and others) for execution. These commonwealth documents reinforce US operational concepts and organizational structures, and along with other key nations' doctrines, further American dominance in dealing with the contemporary operational environment threats.

The French Army's *Winning the Battle Building Peace: Land Forces in Present and Future Conflicts*, and the French *White Paper on Defence and National Security* draws insights into the emerging security challenges of the contemporary operational environment which parallel those of the US national command authority.<sup>18</sup> Likewise, the German *Konzeption der Bundeswehr* and the 2006 *White Paper on German Security Policy and the Future of the Bundeswehr* support observations regarding the lack of

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<sup>17</sup>Ministry of Defence, Development, Concepts, and Doctrine Centre, Strategic Trends Programme 2007-2036, Global Strategic Trends, *Strategic Defence Review*, 4rd ed., 2007, <http://www.mod.uk/DefenceInternet/MicroSite/DCDC/OurPublications/StrategicTrends+Programme/> (accessed 8 May 2010); House of Commons, "Delivering Security in a Changing World," Research Paper 04/71, Defence White Paper, 2004, <http://www.parliament.uk/commons/lib/research/rp2004/rp04-071.pdf> (accessed 8 May 2010).

<sup>18</sup>Ministere De La Defense. *Winning the Battle Building Peace: Land Forces in present and Future Conflicts*. Translated by a panel of British and French officers and academic military experts, January 2007, [http://www.cdef.terre.defense.gouv.fr/doctrineFT/doc\\_fond/FT\\_01/FT-1\\_eng.pdf](http://www.cdef.terre.defense.gouv.fr/doctrineFT/doc_fond/FT_01/FT-1_eng.pdf) (accessed 8 May 2010); Council on Foreign Relations, White Paper on Defence and National Security, June 2008, [http://www.cfr.org/publication/16615/french\\_white\\_paper\\_on\\_defence\\_and\\_national\\_security.html](http://www.cfr.org/publication/16615/french_white_paper_on_defence_and_national_security.html) (accessed 8 May 2010).



conventional military threats and the increase of non-state actors that have drastically altered the international security environment.<sup>19</sup>

The US Joint Forces Command (USJFCOM) serves as the US joint force executive agent for transformation and as the NATO Allied Command Transformation. It is important to note that while USJFCOM is currently conducting GEOINT cell development, NATO does not have a unified GEOINT definition. The USJFCOM's *Joint Operating Environment: Trends and Challenges for the Future Joint Force Through 2030* is a major endeavor that provides a framework for considering the future and determining the impact of the operational environment on joint force operations.<sup>20</sup> Similarly, the Australian government's view of the greater Asia-Pacific and their Army's *Complex Warfighting and Adaptive Campaigning Future Land Operational Concept* share much with the American concept of joint force applications for full-spectrum operations in a future dominated by persistent conflict.<sup>21</sup>

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<sup>19</sup>Federal Ministry of Defense, "French White Paper on German Security Policy and the Future of the Bundeswehr," 2006, [http://merln.ndu.edu/whitepapers/Germany\\_White\\_Paper\\_2006.pdf](http://merln.ndu.edu/whitepapers/Germany_White_Paper_2006.pdf) (accessed 8 May 2010).

<sup>20</sup>Headquarters, Joint Forces Command, *Joint Operating Environment: Trends and Challenges for the Future Joint Force Through 2030* (Norfolk, VA: Government Printing Office, November 2008), [www.jfcom.mil/newslink/storyarchive/2008/JOE2008.pdf](http://www.jfcom.mil/newslink/storyarchive/2008/JOE2008.pdf) (accessed 8 May 2010).

<sup>21</sup>David Kilcullen, Australian Army. *Complex Warfighting and Adaptive Campaigning Future Land Operational Concept*. Draft Developing Concept, 7 April 2004, [http://www.quantico.usmc.mil/download.aspx?Path=../Uploads/Files/SVG\\_complex\\_warfighting.pdf](http://www.quantico.usmc.mil/download.aspx?Path=../Uploads/Files/SVG_complex_warfighting.pdf) (accessed 8 May 2010).

In accordance with *Title 10, US Code 467*, GEOINT is defined as “imagery, imagery intelligence and geospatial information.”<sup>22</sup> Even though other nations do not define GEOINT in the same terms, the basic geospatial referenced collection and exploitation is understood to be common. The US Department of Defense Directive 5105.60, *National Geospatial-Intelligence Agency*, directs the National Geospatial-Intelligence Agency (NGA) to support US national security objectives by providing timely, relevant, and accurate GEOINT to the Department of Defense, the Intelligence Community, other US Government departments and agencies, and partner nations.<sup>23</sup>

### Professional Forums

Many of the US key allies have implemented policy to influence the strategic vision of their defense forces. The integration of these visions is prevalent within Australia, Canada, Great Britain, New Zealand and the US, commonly referred to as the “Five-Eye” nations. In 2009, this researcher was instrumental in bringing New Zealand back into the Five-Eye information and intelligence sharing community.

Formed in 1948, the Air and Space Interoperability Council is an active and productive international organization that works for Five-Eye air forces.<sup>24</sup> Its principal objective is to ensure member nations are able to fight side-by-side as airmen in joint and

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<sup>22</sup>National Geospatial Intelligence Agency, “GEOINT,” Title 10, United States Code 467, <https://www1.nga.mil/About/WhatWeDo/GeoInt/Pages/default.aspx> (accessed 8 May 2010).

<sup>23</sup>Department of Defense, United States Directive 5105.60, *National Geospatial-Intelligence Agency* (Washington, DC: Government Printing Office, 29 July 2009), <http://www.dtic.mil/whs/directives/corres/pdf/510560p.pdf> (accessed 8 May 2010).

<sup>24</sup>Air and Space Interoperability Council (ASIC), ASIC Programs and Links, <http://www.dtic.mil/asic/> (accessed 8 May 2010).

combined operations. It provides standardization of doctrines, operational procedures, materiel, and equipment. The Air and Space Interoperability Council also exchanges technical information and arranges the free loan of equipment between member nations for test and evaluation purposes.

The ABCA (Australia, Britain, Canada and America, and New Zealand) forum has the duty to optimize Five-Eye Army interoperability in order to deliver success in coalition operations.<sup>25</sup> ABCA addresses current tactical and operational interoperability level issues within the context of contemporary joint full spectrum operations, as well as addressing longer-term interoperability requirements. It also shares and exploits information to support the transformation and modernization of ABCA Armies.

The AUSCANNZUKUS (Australia, Canada, New Zealand, United Kingdom and US) forum fosters knowledge sharing that enables the Five-Eye naval warfighter to successfully complete missions across the spectrum of Joint and Combined Operations.<sup>26</sup> The Combined Communications and Electronics Board is a Five-Eye joint military communications-electronics organization whose mission is the coordination of any military Command, Control, Communications, and Computer matter that is referred to it by a member nation.<sup>27</sup>

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<sup>25</sup>Australia, Britain, Canada, America and New Zealand Armies, <http://www.abca-armies.org/Error.aspx?aspxerrorpath=/Organization/Default.aspx> (accessed 8 May 2010).

<sup>26</sup>AUSCANNZUKUS, Information Portal, <http://www.auscannzukur.net/> (accessed 8 May 2010).

<sup>27</sup>Combined Communications and Electronics Board (CCEB), Public Website, <http://jcs.dtic.mil/j6/cceb/> (accessed 8 May 2010).

The Multinational Interoperability Council is a seven nation (Australia, Canada, Great Britain, US, France, Germany, and Italy) multinational forum for identifying interoperability issues and articulating actions at the strategic and high operational levels which, if nationally implemented by the member nations, would contribute to more effective coalition operations.<sup>28</sup> It provides an adaptive and agile framework to allow potential Lead Nations the opportunity to identify interoperability issues and articulate courses of action to set the conditions, at the strategic and operational level, for more effective coalition operations within and outside extant political alliances.

The NATO Standardization Agency (NSA) initiates, coordinates, supports and administers standardization activities conducted under the authority of the NATO Committee for Standardization (NCS).<sup>29</sup> Standardization is defined within NATO as the process of developing concepts, doctrines, procedures, and designs to achieve and maintain the most effective levels of compatibility, interchangeability and commonality in the operational, procedural, materiel, technical, and administrative fields. The primary products of this process and NATO's tools for the enhancement of interoperability are Standardization Agreements between member nations.<sup>30</sup>

The NATO Allied Command Transformation is NATO's leading agent for change by driving, facilitating, and advocating continuous improvement of Alliance capabilities

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<sup>28</sup>Multinational Interoperability Council, "Overview, Vision, Mission," <http://jcs.dtic.mil/j3/mic/> (accessed 8 May 2010).

<sup>29</sup>North Atlantic Treaty Organization, "Standardization," Updated 4 November 2008, <http://www.nato.int/issues/standardization/index.html> (accessed 8 May 2010).

<sup>30</sup>North Atlantic Treaty Organization, Standard Agreements (STANAGs), Last updated 22 April 2010, <http://www.nato.int/cps/en/natolive/stanag.htm> (accessed 8 May 2010).

to maintain and enhance the military relevance and effectiveness of the Alliance.<sup>31</sup> The NATO Allied Command Transformation is collocated with the USJFCOM at Norfolk, Virginia. The Allied Command Transformation provides appropriate support to NATO missions and operations, leads NATO military transformation, and improves relationships, interaction, and practical cooperation with partners, nations, and international organizations.

The NGA is an intelligence agency of the US Government with the primary mission of collection, analysis, and the distribution of GEOINT in support of national security and our partner nations.<sup>32</sup> The NGA is the largest global GEOINT agency and most US allied nations directly coordinate through NGA Support Teams (NSTs) for support. The US National System for Geospatial Intelligence (NSG) is the governing body of the US GEOINT community, which has military services, intelligence agencies, National Guard Bureau, federal law enforcement agencies, federal agencies and Five-Eye nations as voting members.<sup>33</sup>

In 2004, the NSG also created the National Center for Geospatial Intelligence Standards (NCGIS), which is the coordinating organization within the NGA that is responsible for setting and implementing GEOINT standards and management policies

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<sup>31</sup>North Atlantic Treaty Organization (NATO) Allied Command Transformation (ACT), Homepage, <http://www.act.nato.int/> (accessed 8 May 2010).

<sup>32</sup>National Geospatial-Intelligence Agency, Homepage, [www.nga.mil](http://www.nga.mil) (accessed 8 May 2010).

<sup>33</sup>National Geospatial Intelligence Agency, NSG, <https://www1.nga.mil/About/WhoWeAre/NSG/Pages/default.aspx> (accessed 8 May 2010).

for NGA and the NSG community.<sup>34</sup> The Geospatial Intelligence Standards Working Group (GWG) is chartered under the Department of Defense Information Technology Standards Committee, and is the governing group responsible for developing and promoting standards for interoperability in support of net-centricity within the US Department of Defense.<sup>35</sup> The GWG provides the forum for the coordination of GEOINT standards for the NSG. The GWG is led and chaired by the NGA's NCGIS. It is important to note that the GEOINT data stream requires the largest bandwidth for full motion video, hyper-spectral and multispectral imagery.

The Defence Geospatial Information Working Group is the multi-national body responsible to the defense organizations of twenty-three member nations (mostly NATO nations) for coordinated advice and policy recommendations on geospatial standardization issues.<sup>36</sup> It will meet coalition interoperability challenges by creating the standards and procedures required to enable the provision, exchange and use of standardized geospatial information. It supports the requirements of NATO and the other alliances in which its member nations participate, including UN sanctioned peacekeeping. The requirements have been identified to address a specific set of operational scenarios. Eight operational scenarios, each requiring various types of geospatial support, serve as a guide for Defence Geospatial Information Working Group client interaction and project

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<sup>34</sup>National Geospatial Intelligence Agency, "GEOINT Standards," <https://www1.nga.mil/ProductsServices/geointstandards/Pages/default.aspx> (accessed 8 May 2010).

<sup>35</sup>Geospatial Intelligence Standards Working Group, "About the GWG," <http://www.gwg.nga.mil/> (accessed 8 May 2010).

<sup>36</sup>Defence Geospatial Information Working Group, "About the GWG," <http://www.dgiwg.org/dgiwg/> (accessed 8 May 2010).

management. These eight scenarios are: Coalition War Fighting Operation; Coalition Peacekeeping Operation; Coalition Counter-Terrorist Operation; Non-Combat Evacuation Operation; United Nations Humanitarian Aid Operation; Coalition Sanctions Enforcement Operation; Peacetime/Routine Exchange and Co-Production; and, Asymmetric Threat Preparedness Operation. Defence Geospatial Information Working Group operates as a consensus organization that builds its standards based on international standards and commercially available industrial specifications. It closely cooperates with the International Organization of Standardization (ISO), Technical Committee (TC) Geographic Information/Geomatics (ISO/TC 211), and other international organizations addressing related specializations of geographic information.<sup>37</sup> The Defence Geospatial Information Working Group geospatial standards are built upon the generic and abstract standards for geographic information defined by the International Organization for Standardization (ISO TC/211). Defence Geospatial Information Working Group makes use of the service specifications endorsed by the Open Geospatial Consortium (OGC).<sup>38</sup>

The ISO is the world's largest developer and publisher of International Standards. The ISO is a network of the national standards institutes of 162 countries, one member per country, with a Central Secretariat in Geneva, Switzerland that coordinates the

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<sup>37</sup>International Organization for Standardization, Technical Circular 211, *Geographic Information/Geomatics*, 2009, <http://www.isotc211.org/> (accessed 8 May 2010).

<sup>38</sup>Open Geospatial Consortium Inc., OGC Website, <http://www.opengeospatial.org/> (accessed 8 May 2010).

system. Common ISO imagery data formats include Jpeg, Mpeg, Tiff, BMP, and many other collection platform (camera, airborne and satellite) data formats.<sup>39</sup>

The Open Geospatial Consortium is an international industry consortium of 389 companies, government agencies and universities participating in a consensus process to develop publicly available interface standards. OpenGIS Standards support interoperable solutions that “geo-enable” the Internet/Web, wireless and location-based services, and mainstream Information Technology.<sup>40</sup> The standards empower technology developers to make complex spatial information and services accessible and useful with all kinds of applications. The Open Geospatial Consortium standards applied to governmental solutions are likened to Google Earth at the classified levels; that is, recently, governments are increasingly using Open Geospatial Consortium standards to easily understand and visualize ISO and open standard data on web-based viewers.

The United States Geospatial Intelligence Foundation is the only organization dedicated to promoting the GEOINT tradecraft and building a stronger community of interest across industry, academia, government, professional organizations, and individuals.<sup>41</sup> As a non-profit educational foundation, United States Geospatial Intelligence Foundation strives to bring together the GEOINT community and support life-long learning that will ensure a robust cadre of professionals and a healthy tradecraft

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<sup>39</sup>International Organization for Standardization, Homepage, <http://www.iso.org/iso/home.htm> (accessed 8 May 2010).

<sup>40</sup>Open Geospatial Consortium Inc. Official Names Space of the OpenGIS schemas, [www.opengis.net](http://www.opengis.net) (accessed 8 May 2010).

<sup>41</sup>United States Geospatial Intelligence Foundation, Homepage, <http://usgif.org/> (accessed 8 May 2010).



now and in the future. The United States Geospatial Intelligence Foundation's purpose is to promote the GEOINT tradecraft and to develop a stronger community of interest between government, industry, academia, professional organizations, and individuals who share a mission focus around the development and application of GEOINT to address national security objectives. The United States Geospatial Intelligence Foundation has just recently conducted their first ever GEOINT 101 course, and has been working with several national universities in developing Graduate Certificates in GEOINT education. Currently, the United States Geospatial Intelligence Foundation conducts the largest GEOINT conference in the world.

The American Society for Photogrammetry and Remote Sensing is the American component of its international parent.<sup>42</sup> The American Society for Photogrammetry and Remote Sensing advances knowledge and improves understanding of mapping sciences and promotes the responsible applications of photogrammetry, remote sensing, geographic information systems (GIS) and supporting technologies. The society ties together all imagery professionals from surveyors to analysts into a fraternal society.

The Institute of Electrical and Electronics Engineers (IEEE) is the world's largest technical professional association advancing innovation and technological excellence for the benefit of humanity.<sup>43</sup> IEEE and its 400,000(+) members and 1,860 international chapters inspire a global community to innovate for a better tomorrow through its highly cited publications, conferences, technology standards, and professional and educational

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<sup>42</sup>American Society for Photogrammetry and Remote Sensing, asprs on-line, <http://www.asprs.org/> (accessed 8 May 2010).

<sup>43</sup>Institute of Electrical and Electronics Engineers, Homepage, <http://www.ieee.org/portal/site> (accessed 8 May 2010).

activities. IEEE is the trusted “voice” for engineering, computing, and technology information around the globe. Through its global membership, IEEE is a leading authority on areas ranging from aerospace systems, optical remote sensing systems, computers, and telecommunications to biomedical engineering, electric power, and consumer electronics among others.

The US Army Geospatial Community Contact List (GCCL) is a detailed collection of easily referenced contact information for active, defense geospatial community members.<sup>44</sup> This GCCL list consists of over 700 active US Army, Marine Corps, Canadian, British, and Australian contacts, and is the only existing registry of names available for open defense geospatial dialogue. It is important to note that these contacts are more than likely those geospatial personnel who are actively involved in GEOINT support at the tactical levels. No other nation or supporting agency has a similar contact list.

The US Army Special Operations Geospatial News is the most comprehensive collection of periodic information shared with the US Army GCCL. It consists of remote sensing, geospatial information, data standards, and production facts and ongoing research. The US Army Special Operations Command has an invested interest to be the worldwide leader of actionable GEOINT at the tactical level.<sup>45</sup>

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<sup>44</sup>Geospatial Community Contact List, <http://gccl.geospatial-community.com/> (accessed 8 May 2010).

<sup>45</sup>William Farr, United States Army Special Operations Geospatial News. Registration with the Geospatial Community Contact List is required to receive this newsletter.

### Doctrinal Multi-National Publications

In conjunction with the USJFCOM, *Future Operational Environment* study, the US Joint Publication 3-0, *Doctrine for Joint Operations* provides the doctrinal foundation and fundamental principles that guide the Armed Forces of the US in the conduct of joint operations across the range of military operations.<sup>46</sup> The US Joint Publication 3-16, *Multinational Operations*, provides doctrine for the Armed Forces of the US when they operate as part of a multinational force. It describes joint organizational structures essential to coordinate air, land, maritime, space, and special operations. Also, it addresses operational considerations that the commander and staff should consider during the planning and execution of multinational operations. The Joint Publication 5-0, *Doctrine for Joint Planning*, provides military guidance for the exercise of authority by combatant commanders and other joint force commanders (JFCs) and, provides guidance for joint planning integration of military actions with those of other instruments of national power and our multinational partners. JP 5-0 further describes the Joint Operation Planning Process, and Operational Art and Design. Finally, the US Army Field Manual 3-0, *Operations*, provides guidance on Army operations, the current operational environment, full spectrum operations and, how to Command and Control operations by use of Battle Command.

The USJFCOM and NGA responded to the contemporary operational environment and the abovementioned military publications with Joint Publication 2-03,

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<sup>46</sup>US Joint Forces Command, *Future Operational Environment* (Norfolk, VA: USJFCOM), [www.jfcom.mil](http://www.jfcom.mil) (accessed 8 May 2010); Chairman, Joint Chiefs of Staff, Joint Publication 3-05, *Doctrine for Joint Special Operations*, [http://www.dtic.mil/doctrine/new\\_pubs/jointpub\\_operations.htm](http://www.dtic.mil/doctrine/new_pubs/jointpub_operations.htm) (accessed 8 May 2010).

*Geospatial Intelligence Support to Joint Operations*.<sup>47</sup> JP 2-03 discusses GEOINT roles, planning, coordination, production, dissemination, and existing architectures that support GEOINT and the geospatial information and services for the intelligence officer in planning, execution, and assessment of the mission. It attempts to discuss GEOINT cell support for the Intelligence Officer but falls short in providing understanding and visualization to the commander. Each of the US military services has developed their own application of GEOINT. The US Marine Corps has the most comprehensive GEOINT structure under their Marine Corps Warfighting Publication 2-12.1, *Geographic Intelligence*, which supports the Marine Air Ground Task Force concept.<sup>48</sup> In July 2000, the US Marine Corps consolidated its topographic engineers and imagery intelligence into one comprehensive GEOINT cell organization within the Marine Corps Intelligence Agency (MCIA). Their ability to provide unfettered understanding and visualization to commanders is exceptional. The other services place GEOINT mostly under applications and capabilities, thus tied to systems and procedures, with service GEOINT structure becoming more fractured. Problems arise when the USJFCOM is describing GEOINT cells with JP 2-03, since there is truly no joint GEOINT foundation amongst the services.

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<sup>47</sup>Chairman, Joint Chiefs of Staff, Joint Publication (JP) 2-03, *Geospatial Intelligence Support to Joint Operations*, [http://www.dtic.mil/doctrine/new\\_pubs/jp2\\_03.pdf](http://www.dtic.mil/doctrine/new_pubs/jp2_03.pdf) (accessed 8 May 2010).

<sup>48</sup>U.S. Marine Corps, Marine Corps Warfighting Publication 2-12.1, *Geographic Intelligence* (Washington, DC: Department of the Navy, 6 July 2000), <http://www.fas.org/irp/doddir/usmc/mcwp2-12-1.pdf> (accessed 8 May 2010).

### Previous Research

Previous research is divided between the World Health Organization conducting a detailed analysis of stewardship and as a function of a health system, and the USJFCOM conducting GEOINT cell structure experimentation, both of which provide background for the primary research question.

#### World Health Organization Stewardship

From 2000-2001, the World Health Organization conducted a detailed analysis of stewardship as a function of a health system. Their report states that a government does not need to budget and provide all health interventions. However, it needs to set the “direction for both public and private sectors and ensure that the health system contributes to the socially desired intrinsic goals. How well or poorly a government executes its stewardship role can influence all aspects of health system performance.”<sup>49</sup> The World Health Organization report also identified the difficulty in translating and preserving the essence of stewardship into other languages, but agreed there were three key elements. First, stewardship is the ‘glue’ that binds a health system together. Second, stewardship is the ‘oil’ that keeps it running consistently. Third, stewardship is the ‘energy’ that gives it moral and ethical direction, and momentum.

The World Health Organization report identified three separate, but equal, classification events that highlight stewardship tasks (see table 1).

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<sup>49</sup>World Health Organization. “Stewardship.” [http://www.who.int/health-systems-performance/sprg/hspa06\\_stewardship.pdf](http://www.who.int/health-systems-performance/sprg/hspa06_stewardship.pdf) (accessed 8 May 2010), 41.

Table 1. Three Classifications of Tasks for Stewardship

WHO Report 2000	Consultation	Travis et al. (2002)
Collecting and using information	Collecting and using intelligence	1. Generation of intelligence
Defining the vision and direction of health policy	Formulating health policy	2. Formulating strategic policy direction
Exerting influence through regulation and advocacy	Exerting influence	3. Ensuring tools for implementation: powers, incentives and sanctions
		4. Coalition building / Building partnerships
		5. Ensuring a fit between policy objectives and organizational structure and culture
		6. Ensuring accountability

*Source:* World Health Organization, “Stewardship,” [http://www.who.int/health-systems-performance/sprg/hspa06\\_stewardship.pdf](http://www.who.int/health-systems-performance/sprg/hspa06_stewardship.pdf) (accessed 8 May 2010), 43.

This table attempts to “provide evidence-based advice on the relationship between stewardship and system outcomes.”<sup>50</sup> The World Health Organization declared that governments are primarily responsible for executing a health systems stewardship function yet does not imply that governments are responsible for all the essential tasks. Governments develop partnerships, intelligence, vision/direction, influence change, and enable stewardship.

Figure 1 shows the six elements of stewardship (from table 1) and presents an interconnected model for the six elements.

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<sup>50</sup>Ibid., 45.

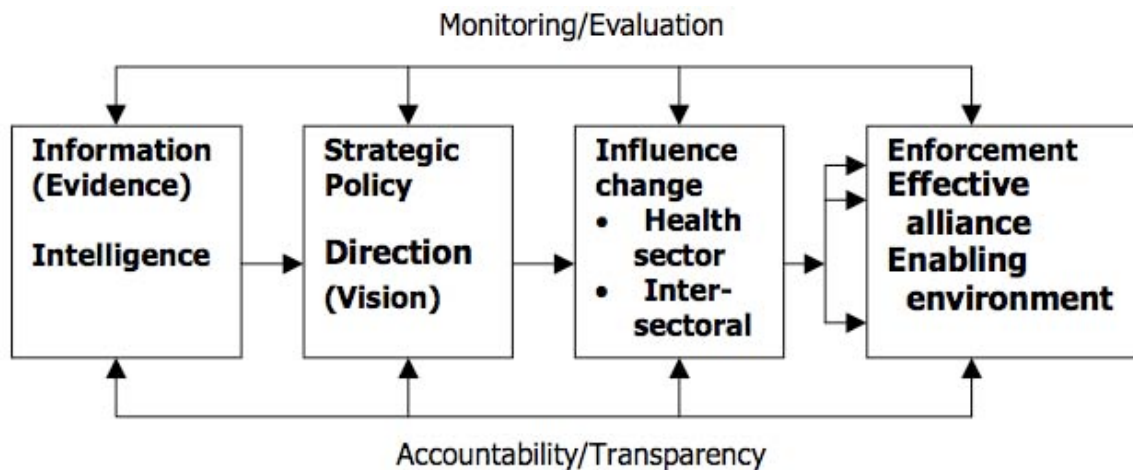


Figure 1. Six Elements of Stewardship

Source: World Health Organization. “Stewardship.” [http://www.who.int/health-systems-performance/sprg/hspa06\\_stewardship.pdf](http://www.who.int/health-systems-performance/sprg/hspa06_stewardship.pdf) (accessed 8 May 2010), 47.

The World Health Organization report discusses assessing stewardship by developing a quantitative and qualitative “survey instrument that would include questions on all domains of stewardship, accompanied by vignettes.” Also, that a set of training modules for stewardship capacity building is required. This report is key in that it sets the tone for a model that can be used across other stewardship paradigms, and identifies the need for a survey instrument and training requirements to enable performance.

#### USJFCOM GEOINT Cell Experimentation

From 2006-2008, the USJFCOM participated in exercises Trident Warrior (TW) 2006, Strong Angel III 2006, Trident Warrior 2007, EMPIRE CHALLENGE (EC) 2008 and NOBEL RESOLVE (NR) 2008, to “validate the need for, refine the high level functions of, and examine the composition of the GEOINT Cell” described in the Joint Warfighter Interoperable GEOINT (JWIG) Concepts of Operations and Joint Publication

2-03, GEOINT Support to the Joint Warfighter.<sup>51</sup> These experiments examined the requirement for a GEOINT Cell and validated its capabilities to “improve information fusion, visualization, analysis and sharing,” the last two exercises examining the capabilities and structure of the GEOINT Cell.<sup>52</sup>

In figure 2, the GEOINT Cell serves as a Joint Task Force cross-functional coordination cell that facilitates the use of “standardized GEOINT processes, procedures, and organizations” across the National System for GEOINT, Combatant Commands, Services, and Agencies to “enhance organic capabilities to conduct effective joint operations.”<sup>53</sup> While the exercises provided room for USJFCOM to stretch the GEOINT Cells proverbial legs by improving shared SA, it did not provide the true cross functional coordination of a cell. Nor did it integrate itself into the civil-military operational planning cycle, joint planning guidance, joint operational planning process, or higher level problem solving. Likewise, in order to assess the GEOINT Cell, USJFCOM developed a detailed checklist of GEOINT operations, planning, releasability, emerging technology, maintenance, shared awareness, and enhanced SA considerations.

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<sup>51</sup>Headquarters, Joint Forces Command. *Composition and Functions of a Joint Geospatial Intelligence Cell: Report on Results from Experimentation, 2006-2008*. Joint Transformation Command–Intelligence (JTC-I), 15 May 2009, 2.

<sup>52</sup>Ibid.

<sup>53</sup>Ibid., 1.



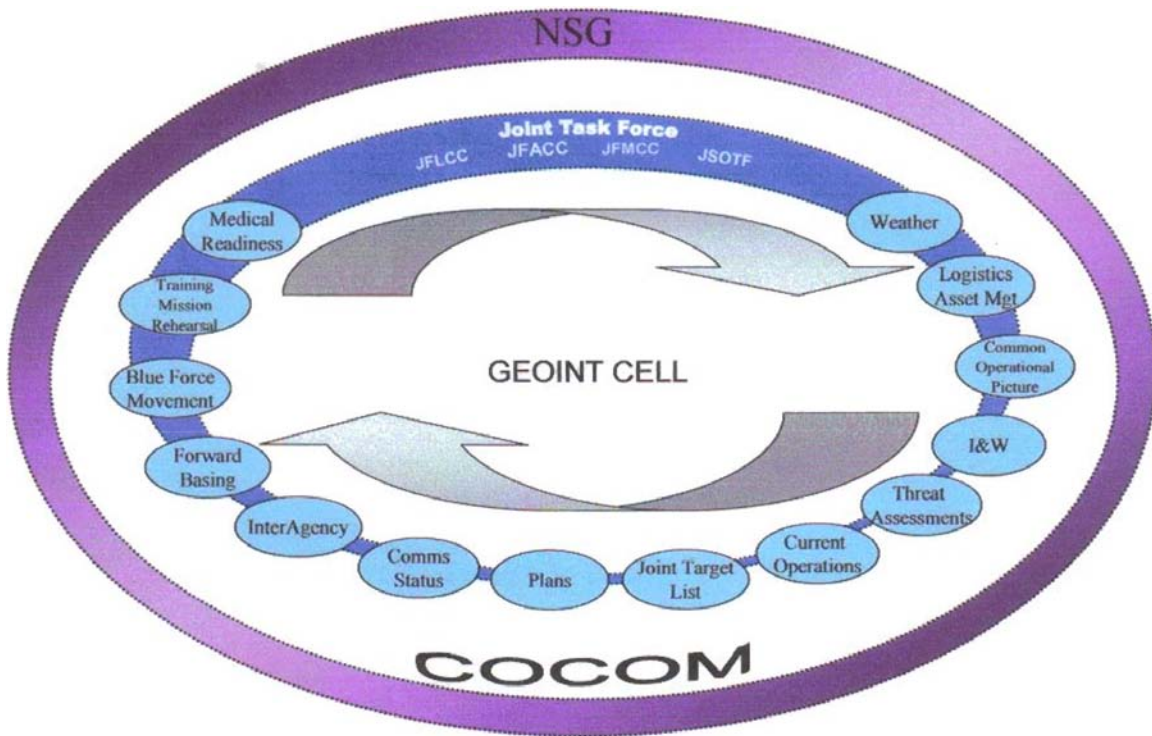


Figure 2. GEOINT Cell Cross Functional Coordination

Source: Headquarters, Joint Forces Command. *Composition and Functions of a Joint Geospatial Intelligence Cell: Report on Results from Experimentation, 2006-2008*, Joint Transformation Command–Intelligence (JTC-I), 15 May 2009.

The GEOINT Cell includes those personnel and capabilities that “lead, coordinate and provide GEOINT support to the joint warfighter.”<sup>54</sup> The appointed GEOINT Officer leads the GEOINT Cell to enable GEOINT support in a “multi-directional, standards-based environment, which leverages emerging network enabled and leadership centric warfighter capabilities and captures value-added tactical data to be discoverable by all.” Depending on the depth and degree of the JTF mission, the GEOINT Cell can enlarge in size for missions with increased operational environment exploitation (i.e. Tsunami, Haiti, ant others), or increase in GEOINT Officer civil-military planning expertise at

<sup>54</sup>Ibid., 7.

higher levels of operations. In figure 3, the GEOINT Cell consists of about five experts who conduct day-to-day cell functions and coordinate existing GEOINT capabilities in support of the designated mission. The extended GEOINT Cell provides JTF cross-functional information fusion, visualization, analysis, and sharing. Depending on the nature of the JTF mission, the GEOINT Cell can conduct unclassified and classified mission support, utilizing commercial, unclassified, and NTM sources.

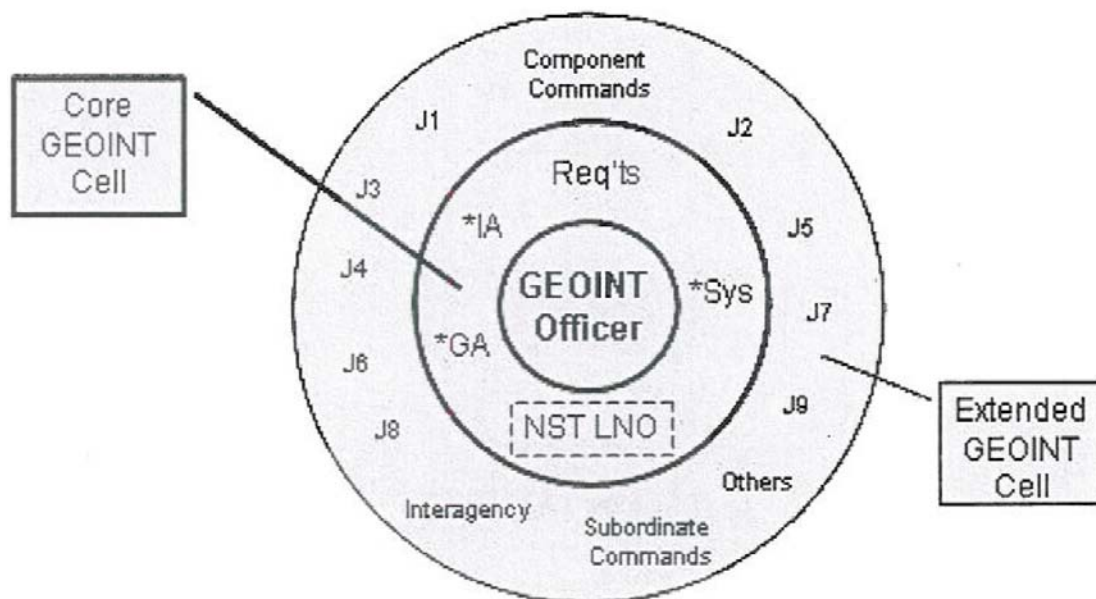


Figure 3. GEOINT Cell Organizational Construct

Source: Department of Defense, Memorandum, Subject: Joint Geospatial Intelligence Transformation DOTMLPF Change Recommendation, Washington, DC, 25 June 2008.

Currently, the USJFCOM is developing the GEOINT Cell within the “Joint GEOINT Transformation DOTMLPF Change Recommendation”, dated 25 June 2008. The Joint Requirements Oversight Council (JROC) endorsed the Doctrine, Organization, Training, Material, Leadership, Personnel and Facility (DOTMLPF) Change

Recommendation (DCR), and appointed the NGA as the overall lead organization to implement the DCR (see Appendix A).

In July 2009, the USJFCOM assumed leadership of the annual Empire Challenge exercise from the National Geospatial-Intelligence Agency. In July 2010, Empire Challenge 2010 will move from China Lake Naval Air Weapons Station, California, to Fort Huachuca, Arizona. The move will continue to demonstrate live joint, NATO and coalition ISR interoperability. USJFCOM and NATO will cooperate in the USJFCOM GEOINT Cell as any efforts will hopefully be advantageous for further NATO transformation.

After assessing the primary research question based on the foundation of statutes, professional journals, official publications and previous research, a study of relevant articles and studies to include theses was conducted and is provided below.

### Articles

In 2007, COL Richard Barrowman, the then USJFCOM Geospatial Officer, wrote “Geospatial Intelligence: The New Intelligence Discipline” in the Joint Forces Quarterly. He discusses the use of the Joint GEOINT Activity (JGA) by USJFCOM to provide for and inform the Joint Force Commander.<sup>55</sup> The JGA has five lines of operations which tie the GEOINT Cell to the Joint Forces Commander as follows: (1) defines the GEOINT requirements through the Joint Planning Group; (2) enables the joint warfighter to make a decision on the most cost-effective approach for meeting the requirements within specific

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<sup>55</sup>Richard Barrowman, “Geospatial Intelligence: The New Intelligence Discipline,” *Joint Forces Quarterly* (2007), [http://www.ndu.edu/inss/Press/jfq\\_pages/editions/i44/21.pdf](http://www.ndu.edu/inss/Press/jfq_pages/editions/i44/21.pdf) (accessed 8 May 2010).

timeliness; (3) directs phased GEOINT exploitation; (4) enables the joint warfighter to use superior GEOINT to plan, decide, act, and monitor; and (5) ensures the data is kept current and relevant. The ultimate goal is to provide a true and unmitigated current picture, whereby the GEOINT Cell provides understanding and visualization of the operational environment to the decision maker and considers the data currency risk mitigation efforts.

Dan Raducanu, Chief for Romania's Center for Geospatial Intelligence (CGINT) comprehensively details their GEOINT operations in support of Operation Iraqi Freedom.<sup>56</sup> The CGINT defines GEOINT the same as the US — imagery, imagery intelligence and geospatial information. The CGINT was a pilot program for the Romanian Government, and their GEOINT Cell is an outstanding example of how US, Coalition and Iraqi troops on the ground are the direct beneficiaries of multinational collaboration in GEOINT to support operations in real time.

Major General Michael T. Flynn's, *Fixing Intel: A Blueprint for Making Intelligence Relevant in Afghanistan*, is a sentinel study by the Deputy Chief of Staff, Intelligence (CJ2), for the International Security Assistance Force in Afghanistan since June 2009. He directs that select teams of analysts will be "empowered to move between field elements. . . integrate information collected by civil affairs officers, PRTs, atmospheric teams, Afghan liaison officers, female engagement teams, willing non-governmental organizations and development organization, United Nations officials, psychological operations teams, human terrain teams, and infantry battalions, to name a

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<sup>56</sup>Dan Raducanu, CGIN-Center for Geospatial Intelligence, [http://earth.esa.int/rtd/Events/ESA-EUSC\\_2006/Oral/Ar44\\_Raducanu.pdf](http://earth.esa.int/rtd/Events/ESA-EUSC_2006/Oral/Ar44_Raducanu.pdf) (accessed 8 May 2010).

few.”<sup>57</sup> These analysts will be divided along geographic lines, instead of functional lines, which compartmentalizes problem solving. These information brokers will be part of the Stability Operations Information Centers (SOICs), which may replace fusion centers. They will be the most extroverted and hungriest analysts, with the most challenging and rewarding jobs. The SOIC will require GEOINT analysts “who can enter data into mapping software, allowing customers to use Google Earth and military applications to pinpoint local projects, incidents of violence, major landowners’ holdings, and related information.”<sup>58</sup>

In the *Comprehensive Understanding for Comprehensive Operations*, the Counterinsurgency Advisory and Assistance Team (CAAT), Regional Command West (RC-W), Herat Afghanistan, states that “timely and comprehensive flow of relevant information” is critical to planning and execution in the contemporary operational environment.<sup>59</sup> RC-West created the SOIC to integrate “academic products, Key Leader Engagements (KLEs), surveys, reports from subordinate or adjacent units, battle damage assessments, source operations, or tribal engagements.”<sup>60</sup> The SOIC states that strong G2/S2 (intelligence) fusion is not enough to address ill-structured and wicked problems.

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<sup>57</sup>Michael T. Flynn, “Fixing Intel: A Blueprint for Making Intelligence Relevant in Afghanistan.” *Voices From The Field* (January 2010), 4, [http://www.cnas.org/files/documents/publications/AfghanIntel\\_Flynn\\_Jan2010\\_code507\\_voices.pdf](http://www.cnas.org/files/documents/publications/AfghanIntel_Flynn_Jan2010_code507_voices.pdf) (accessed 8 May 2010).

<sup>58</sup>*Ibid.*, 19.

<sup>59</sup>Stability Operations Information Center (SOIC). *Comprehensive Understanding for Comprehensive Operations* (9 March 2010), 3, <http://cryptome.org/dodi/af-soic-2010.pdf> (accessed 8 May 2010).

<sup>60</sup>*Ibid.*, 3.

The SOIC is tasked to fuse as far left, as comprehensive as possible, and more perspectives and disciplines as needed, and in line with MG Flynn's *Fixing Intel* paper.

The SOIC-West supports,

the Regional Command Team's Civilian and Military COIN Unity of Effort by facilitating information sharing between all relevant actors in order to provide effective understanding of the Operational Environment and enable the development of accurate and timely assessments, comprehensive plans, fully informed decisions and appropriate actions.<sup>61</sup>

### Studies and Theses

LtCol L.H. Remillard's *Making New Friends, Trusting New Friends: The Challenges of Coalition Intelligence Sharing in Afghanistan*, a 2009 Canadian Force College student, argues that intelligence sharing and the development of a common intelligence picture (CIP) in Afghanistan has led to a more effective coalition intelligence apparatus.<sup>62</sup>

Danny Fortin's "Sharing the Burden: How Effective is a Multinational Force in the Contemporary Operational Environment," a 2007 US Army Command and General Staff College student, argues that peace enforcement is too much for the United Nations's capacity. He also argues that "a coalition of Allies and like-minded partners, including comparable regional partners, possessing robust tools and minimal debilitating national caveats, is the most promising and effective military arrangement."<sup>63</sup>

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<sup>61</sup>Ibid., 6.

<sup>62</sup>L. H. Remillard, "Making New Friends, Trusting New Friends: The Challenges of Coalition Intelligence Sharing in Afghanistan" (MDS Research Project, Canadian Force College, April 2009), [www.cfc.forces.gc.ca/papers/csc/csc35/mds/remillard.doc](http://www.cfc.forces.gc.ca/papers/csc/csc35/mds/remillard.doc) (accessed 8 May 2010).

<sup>63</sup>Danny Fortin, "Sharing the Burden: How Effective is a Multinational Force in the Contemporary Operational Environment" (Thesis, Command and General Staff

Andy Sanchez's "Leveraging Geospatial Intelligence (GEOINT) in Mission Command," a 2007 US Army Command and General Staff College student, argues for use of GEOINT as an instrument of and for the execution of policy.<sup>64</sup> Sanchez uses openly available sources covering Hurricane Katrina sources. He does provide emphasis towards a GEOINT Cell, but offers no recommendations, only that early interoperability and cooperation will solve most issues. He particularly emphasizes the use of the internationally recognized use of ArcGIS software as the forcing function to gain understanding and visualization. Although the purpose of the literature review was not to focus on systems or platforms, many of Andy Sanchez's discussion points are applicable to this thesis research.

The RAND Corporation conducts extensive research for the US Government, in particular the US Air Force. There are several RAND studies worth mentioning, but most are tied to systems and platforms efficiency. Carl Rhodes' 2007 RAND Study, "A Strategies-to-Tasks Framework for Planning and Executing Intelligence, Surveillance, and Reconnaissance (ISR) Operations," treats systems and platforms as sensor agnostic.<sup>65</sup> In other words, his RAND study focuses on the ends-ways-means of ISR collection

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College, Fort Leavenworth, KS, 2007), <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA471324&Location=U2&doc=GetTRDoc.pdf> (accessed 8 May 2010).

<sup>64</sup>Andy Sanchez, "Leveraging Geospatial Intelligence (GEOINT) in Mission Command" (Monograph, School of Advanced Military Studies, 2009), <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA506270&Location=U2&doc=GetTRDoc.pdf> (accessed 8 May 2010).

<sup>65</sup>Carl Rhodes, "A Strategies-to-Tasks Framework for Planning and Executing Intelligence, Surveillance, and Reconnaissance (ISR) Operations" (RAND, Project Air Force, 2007), [http://www.rand.org/pubs/technical\\_reports/2007/RAND\\_TR434.pdf](http://www.rand.org/pubs/technical_reports/2007/RAND_TR434.pdf) (accessed 8 May 2010).

strategy. He also alludes to many decision-makers becoming nearly addicted to certain platforms, as in the phrase “Predator Porn.” Yet, what should be used could be called an ISR-operational design, in an end-ways-means approach.

### Summary

A thorough appreciation of the significant literature concerning the contemporary operational environment, battle command, GEOINT, GEOINT cells, the stewardship implications they pose to battle command, and the capabilities needed to provide understanding and visualization is essential to this analysis. The perspectives afforded by the various governmental publications presented above paint a picture of the contemporary operational environment that GEOINT operations must contend with in the future.



## CHAPTER 3

### RESEARCH METHODOLOGY

The previous chapter provided an overview of the literature and research documents used for this thesis. This chapter reflects the framework and methodology used for research in pursuing whether GEOINT stewardship is appropriately integrated into multi-national operations so that our leaders can effectively face the future operational environment.

This thesis provides research, analysis, conclusions, and recommendations concerning GEOINT stewardship and its ability to properly develop the commander's understanding and visualization in accordance with current and future operational environments. In the process of conducting this research, the author noted a significant gap in all GEOINT processes in that they lacked the appropriate inclusion of stewardship in the increased role in multinational operations and the contemporary operational environment.

This chapter examines the primary and secondary research questions and examines the need and quality control of a survey to not only determine the effectiveness of multinational GEOINT operations, but to also find out the thinking behind these operations and what might be able to affect these operations.

The primary research question for this thesis is, "How can geospatial intelligence for multinational operations be made more effective?" To address the primary research question, the following secondary questions must be answered:

1. How does GEOINT support decision makers in the contemporary operational environment?

2. What are the capabilities and limitations of GEOINT cells in providing understanding and visualization of the common operational picture?

3. Is GEOINT cell stewardship understood and practiced in multinational operations?

### Thesis Framework Overview

The following framework for this thesis methodology is:

1. Investigate how proper GEOINT stewardship enables battle command to understand and visualize the contemporary operational environment.
2. Conduct a detailed GEOINT survey to answer the three secondary questions, and analyze the survey results to determine GEOINT operational gaps and fault lines, current GEOINT cells capabilities and limitations, and recommend stewardship bridging methods.
3. Assess the importance of GEOINT stewardship and its increasing role within multinational and, quite possibly, joint operations.
4. And finally, show the relevance of GEOINT stewardship for commanders to successfully understand and visualize the operational environment.

### Design Specifics

The foundation of battle command is the common operational picture and the foundation of the common operational picture is GEOINT. In the contemporary operational environment three concepts tend to get blended in multinational operations: contemporary operational environment, battle command, and the common operational picture. By studying these three concepts, the researcher hopes to give the reader

comprehension of how understanding and visualizing the contemporary operational environment is nested for the decision making process. Next, the research will study the GEOINT cell fundamentals. By studying these GEOINT cell fundamentals, the researcher hopes to give the reader insight into the relevancy of GEOINT and stewardship. By following a consistent and growing thread of relevancy, this thesis seeks to show that GEOINT cell stewardship is essential in multinational operations.

Following the analysis of stewardship as an effective means of transforming multinational operations to understand and operate in a coalition environment, this research analyzes whether GEOINT contains sufficient foundational integration. Additionally, the research examines whether future transformation in multinational operations should reflect change or inclusion of GEOINT stewardship.

Chapter 4 describes the details of the US Army Command and General Staff College students survey used for this research, and chapter 5 analyzes the survey findings. Initial coordination was conducted with the NGA Office of International Policy (i.e. the Multinational Office), the USJFCOM, United States Geospatial Intelligence Foundation and the CGSC Quality Assurance Office to determine what survey information currently exists on GEOINT stewardship. The questions asked to all participants were:

1. How can GEOINT stewardship enable resource management for multinational operations?
2. How does GEOINT stewardship operate at national, strategic, operational and tactical levels?

3. How can these lessons learned be applied for US multinational GEOINT oversight?

Initial research for this thesis began with a literature review from open sources, electronic media, and professional discussions. Since there is no known research on GEOINT stewardship, it is difficult to predict its future. However, one can ask future intentions of the GEOINT community. Therefore, an effective method to determine these future trends for this research is by conducting a survey of GEOINT personnel who have been deployed on multinational operations. A survey gives the ability to not only determine the effectiveness of multinational GEOINT operations, but to also find out the thinking behind these operations and what might be able to affect these operations. For the purpose of this research, the target audience is those personnel who requested or provided GEOINT support while on multinational operations.

#### Instrumentation

The instrument used for this research was a researcher derived census survey. The survey (Appendix A) consists of nine parts: I) Demographics and Education; II) GEOINT Multinational Operation; III) GEOINT Multinational Planning; IV) GEOINT Releasability; V) GEOINT Emerging Technology; VI) GEOINT Maintenance; VII) GEOINT Shared Awareness; VIII) GEOINT Enhanced Situational Awareness; and IX) General Comments. The respondents were invited to include any general comments at the end of the survey. The survey was approved through the CGSC Quality Assurance Office and assigned a survey control number (10-050). Most of the survey questions ask the respondents to reply with a Likert Scale (0= Did Not Observe, 1= Greatly Disagree, 2= Disagree, 3= Neither Disagree Nor Agree, 4= Agree, and 5= Greatly Agree).

After coordinating with the CGSC Quality Assurance Office to identify and clean up potential contaminated survey questions, the author queried the Office of International Affairs and Policy, NGA for survey question viability. They recommended that all reference to NGA and the US Army be removed, and that only the reference of Afghanistan and NATO exist as proper subjects. This would suffice for most international oversight of a survey.

Due to the complexity of dealing with multiple governmental research and survey oversight committees, it was deemed necessary to first test the survey with a group of Five-Eye GEOINT peers, and a group of NATO GEOINT leaders. In November 2009, an initial test pool consisted of distributing the survey to a group of Five-Eye GEOINT peers. In December 2009, a second test pool consisted of distributing the survey to a NATO GEOINT Course taught by the US NGA. Many of the initial survey questions were further correlated, and several questions were reduced to a manageable number.

Next, the US Army CGSC Quality Assurance Office distributed the survey to a census of 1,049 CGSC students, which follows the Joint, Interagency, Intergovernmental, and Multinational model. The first group surveyed was comprised of “Joint” service members including the US Air Force, US Army, US Marine Corps and the US Navy. The second group surveyed was comprised of “Interagency” members including the Federal Bureau of Investigation, Intelligence Agencies, and others. The third group surveyed was comprised of “Intergovernmental” members including the Department of State, Department of Justice, Department of Treasury, Department of Homeland Security, and others. The fourth group surveyed was comprised of “International and Multinational” military service members.

### Survey Structure

The census survey is limited to surveying only those personnel that could be contacted within a reasonable timeframe (March-April 2010). In total, 1,049 personnel were sent surveys via secure CGSC website invitation. Out of the 1,049 invitations, 113 responded, with 39 qualified to take the survey. The survey has a confidence level of over 95 percent and an error interval rate of +/- 14 percent for a population size of 15,000.

The survey is organized by the primary research question answered by asking the three secondary research questions, and the three secondary research questions answered by asking the nine survey question categories- GEOINT operations, planning, releasability, emerging technology, maintenance, shared awareness, enhanced SA, most salient story, and most frustrating story. Each of these nine categories have several assessed questions. Each respondent is allowed to answer each survey question with Greatly Agree, Agree, Neither Agree Nor Disagree, Disagree, Greatly Disagree, and Did Not Observe. It is understood that if a GEOINT activity was not observed it did not have GEOINT stewardship. A sixty-six percent, or two-thirds, of respondents replying at least agreement would identify that a certain survey question and grouping of questions was statistically significant. With the addition of the 14 percent error rate the survey questions will be broken down into three categories: GREEN (66+14, or at least 80 percent); AMBER (53-79 percent); and RED (below 53 percent).

First, the survey indicates what national relationships each respondent is associated with, including military/civilian rank, level of leadership/management, NATO participation, if deployed to Afghanistan, and education. These demographics will be used to determine common relationships among like groups and to identify ways for

targeting GEOINT programs. The survey also attempts to address the level of GEOINT education of each respondent to identify the comprehension of all GEOINT disciplines and to what degree. The assumption is that respondents tend to make smarter GEOINT stewardship decisions based on level of education, applications, and levels of applications.

Second, the survey is designed to identify each respondent's GEOINT support experience for multinational operations. The respondent is asked what type of multinational operation they supported. The type of support that was provided while on multinational operation describes the depth and degree of complexity and GEOINT support required. Finally, the respondent is asked whether adequate GEOINT support was not provided, and if not, what they felt were the reasons. The likely answers may include poor knowledge, legality issues and operational tempo.

Third, the survey is designed to identify each respondent's evaluation of how GEOINT for multinational operations were planned, coordinated, and shared prior to operations, how basic collection strategy methods were coordinated, how the commander understood the support and how the units in question received the support. The assumption is that multinational operations that had successful GEOINT support were properly coordinated and synchronized both prior to and during the operation, and has a high degree of releasability, integrated emerging technology, GEOINT data maintenance, has shared awareness, and enhanced situational awareness.

Finally, the respondent is encouraged to provide general comments. What was the most salient experience? And what were the biggest frustrations? These open comments will be compiled and evaluated for background and contextual understanding. If research

proves a lack of effective integration of stewardship into current GEOINT support for multinational operations, the thesis will make recommendations for change, provide a model for change and propose capacity building requirements. Otherwise, the research will establish the baseline measure of GEOINT stewardship for multinational operations.

### Summary of Survey Design

In addressing potential gaps in a long-standing intelligence discipline like GEOINT, it is critical to implement an effective research methodology and design GEOINT stewardship with concrete literature to support the proposed concepts. GEOINT integration with existing coalition and multinational cultures is paramount for commanders to successfully understand and visualize the operational environment. The next chapter takes the design methodology from chapter 3 and applies analysis of the survey results and the literature from chapter 2, to generate answers to the primary and secondary questions of this thesis. The combined effect is to understand the importance of GEOINT stewardship and to assess its role within multinational operations.



## CHAPTER 4

### RESEARCH FINDINGS

The previous chapter provided an overview of the research methodology and survey design specifics. This chapter reflects the research and survey findings in pursuing whether GEOINT stewardship is appropriately integrated into multi-national operations so that our leaders can effectively face the future operational environment. This chapter includes survey demographics, answers the secondary research questions, and finally, the primary research question. The survey data is then presented for validity and content analysis is conducted to present common and unique themes found in the census population responses. The researcher's interpretation of the survey results is offered by answering the secondary and primary research questions.

#### Survey Significance

Participation in the GEOINT Stewardship survey was “significant enough for a representative sample of the target population.” The target population consisted of 1,049 US Army CGSC students. Of the 113 students who responded to the survey, only thirty-nine answered “Yes” to the qualifying survey question, “Have you requested or provided geospatial intelligence on a multinational operation?” (see table 2). It is understood that of the 113 students who were interested enough to respond and take the survey, only thirty-nine students had the personal experience and knowledge of GEOINT in a multinational operation. It is important to note that the census survey was distributed to 1,049 students of the US Army CGSC 10-01 class, which is the largest class that the US Army CGSC has ever instructed. This exceptionally large class ensured the largest

anonymous spread of knowledge and combat experience, yet also allowed veterans who have participated in non-combat multinational operations to respond (see Appendix B).

Table 2. Survey Population

Total Population	Target Population	Total Sample	Qualified Sample	Percent of Target Population	Survey Error
1,049	1,049	113	39	3.7%	14%

*Source:* Created by author.

While survey questions 1-10 are based on demographics and GEOINT operational considerations, survey questions 11-41 are based on favorable responses to survey questions asked (see table 3). The favorable percentage is the total of “Agree” and “Strongly Agree” percentage responses. The classification is derived as follows: A “Favorable” percentage of 80 percent or above rates “Green,” a “Favorable” percentage between 53 percent and 79 percent rates “Amber,” a “Favorable” percentage of 52 percent or below rates “Red.”

Statistically speaking, if the “true” percentage of favorable responses (which one would get with all 15,000 people queried responding to the survey) is BELOW 66 percent, there is about a 95 percent chance that the favorable response percentage from the 39 respondents will be below 80 percent. Table 3 identifies that, if the observed favorable response percentage is 80 percent or above, there is a 95 percent certainty that the “true” percentage of favorable responses (across a population of 15,000) would be AT LEAST 66 percent. This is where the GREEN designation is established. A similar argument (in reverse) established the RED designation. If the favorable response

percentage is between 53 percent and 79 percent, a favorable and non-favorable statement cannot be made, hence the AMBER designation.

Table 3. Favorable Status Classifications

Standard Favorable Ratings	Survey Error	Adjusted Minimum Favorable Ratings	Favorable Status
66%	+14%	80%	GREEN
66%	-14%	53%	AMBER
		0	RED
Favorable Status: RED (<53%); AMBER (53-79%); and GREEN (80%=>)			

*Source:* Created by author.

### Demographics

#### Level of Operations

In survey question number 1, the population consisted of eight National, seven Strategic (country or province), seventeen Operational (joint task force, province or city), and six Tactical (or community) individual experiences (see table 4). It is commonly understood that GEOINT greatly supports tactical level operations. The thirty-two Operational, Strategic and National level experiences denote a higher level of GEOINT support than what was anticipated. The more probable explanation is that CGSC students tend to have previous assignments across the Joint, International, Interagency and Multinational domains that provide higher-level GEOINT insights. Also, this research may result in a greater understanding of the 43 percent of those operationally focused respondents.

Table 4. Survey Question Number 1, Highest Level of GEOINT Operation

Level of Operation	Count	Percent
National	8	20.5%
Strategic/Country/Province	7	17.9%
Operational/Joint Task Force/Province/City	17	43.6%
Tactical/Community	6	15.4%
Other	1	2.6%
TOTAL	39	100%

*Source:* Created by author.

### Deployed

In survey question number 2, analysis shows that while only five respondents had been deployed once on multinational operations, the remaining thirty-four respondents had been deployed at least twice (see table 5).

Table 5. Survey Question Number 2, Number of Multinational Deployments

Deployments	Count	Percent
1	5	12.8%
2	15	38.5%
3	11	28.2%
4+	8	20.5%
TOTAL	39	100%

*Source:* Created by author.

In survey question number 3, thirty-nine respondents acknowledged their country as a member of NATO. It can be understood that the majority of foreign students in CGSC 10-01 are affiliated with NATO. It came as a surprise that no non-NATO students participated in the survey. It can also be understood that the majority of non-NATO

students in CGSC 10-01 might be unwilling to participate in a GEOINT survey, for fear of sharing their opinions. It can also be understood that those NATO students might have a higher level of GEOINT knowledge and experiences for multinational operations. This research was hoping to include those close non-NATO countries (Australia, New Zealand, South Korea, and others), or from other nations that place weight on educating their officers on the importance of integrating GEOINT into multinational operations.

In survey question number 4, twenty-seven respondents have deployed on NATO operations, while twelve respondents have not deployed on NATO operations (see table 6). This shows that one-third of the respondents (or twelve) have not supported NATO operations, which can be tied to non-NATO operations (i.e. Operation Iraqi Freedom).

Table 6. Survey Question Number 4, Number of NATO Deployments

Deployments	Count	Percent
0	12	30.8%
1	20	51.3%
2	3	7.7%
3	3	7.7%
4+	1	2.5%
TOTAL	39	100%

*Source:* Created by author.

Finally in survey question number 5, twelve respondents stated that they have deployed at least once to Afghanistan, while twenty-seven have not deployed to Afghanistan at all (see table 7). What is not known is if those non-Afghanistan respondents actually deployed in support of Iraqi operations.

Table 7. Survey Question number 5, Number of Afghanistan Deployments

Deployments	Count	Percent
0	27	69.2%
1	10	25.7%
2	0	0%
3	2	5.1%
TOTAL	39	100%

*Source:* Created by author.

### Education

Next, each respondent was asked what type of GEOINT education they had received and the level of education they had received. In Survey Questions number 6 (see table 8) and number 7 (see table 9), the majority of the respondents stated they had received geospatial information education. Of the remaining respondents, the next two significant categories are ISR collection management and targeting education.

Table 8. Comparison of Survey Questions Number 6 and Number 10

#6 and #10 Type of GEOINT Education Received	Pre-Deploy Need	Operational Need	Change
Mission Planning (command & control systems, etc)	10	21	+11
Geospatial Information (maps, terrain analysis, shapefiles, vectors, ground truth, etc)	21	27	+6
Imagery (processing, science, IR, MSI/HSI, etc)	11	23	+12
Imagery Intelligence (analysis, ORBAT, etc)	11	19	+8
Radar, IFSAR, MTO/GMTI, LIDAR, etc	10	7	-3
Full Motion Video	10	11	+1
Survey, GPS foundation/benchmark, gravitational, magnetic	4	3	-1
Network Analysis (human, signals, infrastructure, etc)	6	11	+5
Cultural intelligence layers/Human terrain teams	4	15	+11
Targeting	11	20	+9
Intelligence, surveillance, and reconnaissance collection management	13	16	+3
Space	5	3	-2
Maritime	1	3	+2
Littoral	2	3	+1
(Received no education)	(14)		
<b>TOTAL</b>	<b>119</b>	<b>182</b>	<b>+63</b>

Source: Created by author.

Table 9. Survey Question number 7, Highest Level of GEOINT Education Received

QUESTION #7 COURSE LENGTH	COUNT
University/College Level	2
Military Occupation Specialty/Civilian Skill	2
Long Course (2-4 weeks)	2
Short Course (1-7 days)	5
Received education but uncertain of the level	10
None	17
Other	1

Source: Created by author.

Another possible analysis could be that non-NATO mission partners tend to provide their own geospatial information, targeting, and ISR collection management education, while analysis, processing, and exploitation could entail extensive NATO releasability oversights and classification issues.

Finally, in Survey Question number 8 (table 10), respondents were asked to characterize their personal level of knowledge regarding GEOINT support for multinational operations. Thirty respondents stated they had at least an average level of knowledge developed from training or operational support, while nine stated they had an above average level of knowledge developed from training AND operational support. It is important to note that while fourteen respondents stated they had received no GEOINT education (see table 8), thirty respondents have at least an average level of knowledge (see table 10). Conversely, if one believes the group of thirty respondents, even with no formal training, one could achieve at least an average understanding of GEOINT. This could mean that GEOINT support was easily learned, understood and applied by non-NATO members across multinational operations.

Table 10. Survey Question number 8, Personal Level of GEOINT Knowledge

GEOINT KNOWLEDGE	COUNT
Detailed- supervised multinational support, developed from formal training AND operational support	2
Above Average- developed from training AND operational support	7
Average- developed from training or operational support	21
Limited- based largely on anecdotal information	9

*Source:* Created by author.



### Secondary Research Question Number 1

How does GEOINT support decision makers in the contemporary operational environment? Secondary research question number one is divided into two categories- GEOINT Multinational Operations and GEOINT Multinational Planning. Each of these categories has several apportioned survey questions.

#### GEOINT Multinational Operations

GEOINT Multinational Operations is defined as organizational concept of operations, structure and establishment of a GEOINT officer. In question number 9 (table 11), each respondent was allowed to select those types of missions where they utilized GEOINT support. Three types of multinational operations had the highest responses: Major Operations had a score of twenty-four; Counterinsurgency Operations had twenty-three; and Combating Terrorism had sixteen. The remaining types of operations were between one and twelve responses, which indicates a highly acceptable rating of the highest three operation types as being the dominant and prevailing mission type. Likewise, it can be inferred that the remaining survey questions will support these three mission types.

Table 11. Survey Question Number 9, Multinational Operations

#9 MULTINATIONAL OPERATION GEOINT SUPPORT	COUNT
Major Operations	24
Homeland Defense/Internal Security	3
Civil Support	8
Strikes	9
Raids	9
Show of Force	5
Enforcement of Sanctions	5
Protection of Shipping	2
Freedom of Navigation	2
Peace Operations	12
Support to Insurgency	2
Counterinsurgency Operations	23
Combating Terrorism	16
Noncombatant Evacuation Operations	4
Recovery Operations	5
Consequence Management	3
Foreign Humanitarian Assistance	6
Nation Assistance	6
Arms Control and Disarmament	3
Routine, Recurring Military Activities	11
Other	1

*Source:* Created by author.

Survey question number 10 (table 8) had 182 responses for type of GEOINT support required, compared to Survey Question number 6 (table 8), which had 119 responses (see Appendix B). The plus-sixty-three responses could be attributed to the operational demand placed on GEOINT support and that training back at home station was not properly leveraged. In other words, personnel are deploying to an operational theater severely undertrained for what the multinational mission would require. Comparatively, Survey Questions number 6 and number 10 show (table 8): a significant increase in mission foundation fundamentals such as, mission planning, geospatial

information, imagery and cultural intelligence; an increase in actionable intelligence fundamentals such as, imagery intelligence, full motion video, network analysis, and targeting; and, negligible changes in mission support such as radar, survey, ISR collection management, space, and littoral. The significant increase in mission foundation fundamentals could signify that operational deployments require a higher level of GEOINT understanding than what can be trained at home station. The increase in actionable intelligence training requirements might be provided by classified home station training (i.e. Project Foundry).<sup>66</sup> Finally, the negligible changes in mission support could indicate these types of GEOINT support are highly specialized skills that do not require operational surge capacity. Or, deployed adjunct instructors could be used at the major forward operating bases.

Survey questions number 11 to 14 identify GEOINT operational structure and organization (see table 12). Question number 11 shows twenty-three favorable responses (AMBER) for ‘at least agreeing’ (agree and greatly agree) that GEOINT operations were established according to the commander’s concept of operations, while five respondents at ‘least disagreed’ (disagree and greatly disagree). Question number 12 shows thirty-one favorable responses (AMBER) for at least agreeing that GEOINT operations were integrated into the mission, while two respondents at least disagreed. Question number 13 shows twenty-two favorable responses (AMBER) for at least agreeing that the GEOINT officer was integrated into the mission, while one respondent at least disagreed. Question number 14 shows twenty-two favorable responses (AMBER) for at least agreeing that the

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<sup>66</sup>Foundry Program, Brochure, <http://www.dami.army.pentagon.mil/offices/dami-zxg/documents/foundry-brochure.pdf> (accessed 8 May 2010).

GEOINT cell was synchronized with the unit's battle rhythm, while three respondents at least disagreed.

Table 12. GEOINT Operations, Integration and Synchronization

Survey Questions	Did Not Observe	<= Disagree	Neither Agree Nor Disagree	Agree =>	Status
11. Commanders Concept of Operations	4	5	7	23	Amber
12. Integrated with Mission	2	2	4	31	Amber
13. GEOINT Officer	9	1	7	22	Amber
14. Synchronized with Battle Rhythm	7	3	7	22	Amber
TOTAL (156)	22	11	25	98	
Percentage	14.1%	7.1%	16%	62.8%	AMBER
Favorable Status: RED (<53%); AMBER (53-79%); and GREEN (80%=>)					

*Source:* Created by author.

Table 12 compares survey questions number 11 to 14, which shows that 62.8 percent of the respondents agreed that GEOINT was favorable (AMBER), while 7.1 percent of the respondents disagreed. In addition, 14.1 percent of the respondents “did not observe” GEOINT functionality, which could be mitigated by the GEOINT cell being an established organization in accordance with the commander’s concept of operations. Nevertheless, the ninety-eight favorable responses did provide an AMBER status.

#### GEOINT Multinational Planning

GEOINT Multinational Planning is defined as, “effective command and control demands that commanders and staffs collaborate in planning- determining the mission

statement, commander's intent (objectives, desired effects, and tasks/purpose) and concept of operations.”<sup>67</sup>

Table 13. GEOINT Planning Comparison

Survey Questions	Did Not Observe	<= Disagree	Neither Agree Nor Disagree	Agree =>	Status
15. GEOINT Officer Prioritization	9	1	8	21	Amber
16. Coordinated Multinational GEOINT Collection Strategy	10	3	11	15	Red
17. GEOINT Usefulness	2	1	0	36	Green
18. Planning Staff Understanding	1	9	6	23	Amber
19. Intelligence Staff Understanding	2	5	8	24	Amber
20. Engineer Staff Understanding	10	2	7	20	Red
21. Civil-Military Staff Understanding	10	7	13	9	Red
22. Mission Partners Visualization	6	9	13	11	Red
23. PIR Synchronized With Collection Strategy	3	6	12	18	Red
24. Foreign National Intelligence Synchronized with Collection Strategy	8	12	11	8	Red
TOTAL (390)	61	55	89	185	
Percentage	15.6%	14.1%	22.9%	47.4%	RED
Favorable Status: RED (<53%); AMBER (53-79%); and GREEN (80%=>)					

Source: Created by author.

<sup>67</sup>Chairman, Joint Chief of Staff, Joint Publication 3-0, xvi.

Survey Questions number 15-24 identify GEOINT planning considerations (see table 13). Question number 15 shows twenty-one favorable responses (AMBER) for ‘at least agreeing’ (agree and greatly agree) that the GEOINT prioritized planning considerations, while one respondent ‘at least disagreed’ (disagree and greatly disagree). Question number 16 shows fifteen favorable responses (RED) for at least agreeing that their unit coordinated Multinational GEOINT Collection Strategy, while three respondents at least disagreed. Question number 17 shows thirty-six favorable responses (GREEN) for at least agreeing that GEOINT was useful, while one respondent did not observe this action. Question number 18 shows twenty-three favorable responses (AMBER) for at least agreeing that the planning staff understood GEOINT planning considerations, while nine respondents at least disagreed. Question number 19 shows twenty-four favorable responses (AMBER) for at least agreeing that the intelligence staff understood GEOINT planning considerations, while five respondents at least disagreed. Question number 20 shows twenty favorable responses (RED) for at least agreeing that the engineer planning staff understood GEOINT planning considerations, while two respondents at least disagreed. Question number 21 shows nine favorable responses (RED) for at least agreeing that the civil-military planning staff understood GEOINT planning considerations, while seven respondents at least disagreed. Question number 22 shows eleven favorable responses (RED) for at least agreeing that mission partners visualization was included in GEOINT planning considerations, while nine respondents at least disagreed. Question number 23 shows eighteen favorable respondents (RED) for at least agreeing that priority intelligence requirements were synchronized with GEOINT collection strategy, while six respondents at least disagreed. Question number 24 shows

eight favorable respondents (RED) for at least agreeing that foreign national intelligence was synchronized with their unit's collection strategy, while twelve respondents at least disagreed.

By comparison table 13 shows 185 favorable responses (RED) for agreeing that GEOINT planning considerations were functional, while 14.1 percent of the respondents disagreed. Also, 15.6 percent of the respondents "did not observe" GEOINT planning. The GEOINT cell could mitigate this large disagreement by having an established planning cycle.

### Summary

How does GEOINT support decision makers in the contemporary operational environment? The results in this survey show that, for the officers who participated, GEOINT Multinational Operations knowledge level was AMBER. Furthermore, there is no clear GEOINT officer or structure identified. This finding leads to the conclusion that a GEOINT officer and structure is required for GEOINT stewardship to exist. Findings also show that GEOINT personnel are deploying on multinational operations that require a greater degree of mission training than can be provided at home station. GEOINT Multinational Planning (RED) assessment is that friendly force GEOINT planning was favorable, while multinational (i.e. engineer, civilian, mission partners, foreign nationals) focused GEOINT planning was unfavorable.

It appears that multinational GEOINT support has been based on relationship building, not on established structure. GEOINT planning received the worst overall rating of RED, mostly due to an ambivalent attitude towards its success (neither agree nor disagree) and the large number of "did not observe" responses. It is the individual

leadership and education abilities of current augmented teams that have overcome insurmountable odds to provide multinational SA for decision makers. Hopefully, current efforts by the USJFCOM and NATO in establishing a GEOINT Officer and Cell in accordance with a formal manning document (i.e. Joint Manning Document), will support decision makers in the contemporary operational environment.

### Secondary Research Question Number 2

What are the capabilities and limitations of GEOINT cells in providing understanding and visualization of the common operational picture? Secondary research question number two is divided into five categories- GEOINT Releasability, GEOINT Emerging Technology, GEOINT Maintenance, GEOINT Shared Awareness, and GEOINT Enhanced SA. Each of these categories has several apportioned survey questions.

#### GEOINT Releasability

GEOINT releasability is defined as, “to identify security considerations of GEOINT such as classification levels, procedures or authority to release and/or handle/transfer classified or sensitive information and, interoperability with supporting systems and security domains. To ensure capability to transfer data between security domains consistent with [COCOM] and [DoD] security policies and directives.”<sup>68</sup> Survey questions numbers 25 to 29 identify GEOINT releasability functions (see table 14). Questions number 25, number 26 and number 29 show a high correlation to “agreement”

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<sup>68</sup>Headquarters, Joint Forces Command, Joint Geospatial-Intelligence Activity, *Combatant Command GEOINT Task List* (Norfolk, VA: Government Printing Office, 28 May 2008), 2.6.



with somewhat equal “disagreement”. Question number 25 shows seventeen favorable responses (RED) for ‘at least agreeing’ (agree and greatly agree) that GEOINT releasability was integrated in accordance with mission requirements, while four respondents ‘at least disagreed’ (disagree and greatly disagree). Question number 26 shows twenty-two favorable responses (AMBER) that GEOINT was disseminated to mission partners, while seven respondents at least disagreed. Question number 27 shows twelve favorable responses (RED) that GEOINT was available via web search release, while four respondents at least disagreed. Question number 28 shows thirteen favorable responses (RED) that GEOINT support mitigated area-coverage gaps, while five respondents at least disagreed. Question number 29 shows twenty favorable responses (RED) that mission partners satisfy my unit’s mission requirements, while four respondents at least disagreed. By comparison, table 14 shows that 43.1 percent of the favorable respondents (RED) agreed that GEOINT releasability worked, while 12.3 percent of the respondents disagreed. In addition, 24.1 percent of the respondents “did not observe” GEOINT releasability, which could be mitigated by the GEOINT cell advertising multinational releasability support, or selling itself.

Table 14. GEOINT Releasability

Survey Questions	Did Not Observe	<= Disagree	Neither Agree Nor Disagree	Agree =>	Status
25. IAW Mission Requirements	11	4	7	17	Red
26. Disseminated to Mission Partners	5	7	5	22	Amber
27. Web Search Release	13	4	10	12	Red
28. Mitigate Area-Coverage Gaps	10	5	11	13	Red
29. Mission Partners Satisfy My Reqt's	8	4	7	20	Red
TOTAL (195)	47	24	40	84	
Percentage	24.1%	12.3%	20.5%	43.1%	RED
Favorable Status: RED (<53%); AMBER (53-79%); and GREEN (80%=>)					

*Source:* Created by author.

### GEOINT Emerging Technology

GEOINT Emerging Technology is defined as to integrate emerging GEOINT technologies into a military command to enable or enhance training, operations, maintenance, and other applicable mechanisms. Survey Questions numbers 30-32 identify GEOINT releasability functions (see table 15). Question number 30 shows fifteen favorable responses (RED) for 'at least agreeing' (agree and greatly agree) that GEOINT emerging technology was integrated with mission partners, while four respondents 'at least disagreed' (disagree and greatly disagree). Question number 31 shows thirteen favorable responses (RED) that their GEOINT cell coordinated emerging technology training, while four respondents at least disagreed. Question number 32 shows seventeen favorable responses (RED) that emerging GEOINT technology enhanced their unit's SA, while zero respondents at least disagreed. By comparison, table

15 shows that 38.4 percent of the favorable respondents (RED) agreed that emerging GEOINT technology was functional, while 6.8 percent of the respondents at least disagreed. Also, 27.4 percent of the “neither agree nor disagree” respondents and 27.4 percent of the “did not observe” respondents could have been positively influenced by the GEOINT cell advertising emerging technology support, or selling itself.

Table 15. GEOINT Emerging Technology

Survey Questions	Did Not Observe	<= Disagree	Neither Agree Nor Disagree	Agree =>	Status
30. Integrate with Mission Partners	10	4	10	15	Red
31. Coordinate Training	10	4	12	13	Red
32. Enhanced My Unit's Situational Awareness	12	0	10	17	Red
TOTAL (117)	32	8	32	45	
Percentage	27.4%	6.8%	27.4%	38.4%	RED
Favorable Status: RED (<53%); AMBER (53-79%); and GREEN (80%=>)					

*Source:* Created by author.

#### GEOINT Maintenance

GEOINT maintenance is defined as to coordinate, establish, monitor, utilize and purge data accuracy, version control, data holdings and standardization, and purge databases as necessary. Survey Questions number 33-36 identify GEOINT maintenance functions (see table 16). Question number 33 shows twenty-two favorable responses (AMBER) for ‘at least agreeing’ (agree and greatly agree) that GEOINT integrated data was validated, while zero respondents ‘at least disagreed’ (disagree and greatly disagree). Question number 34 shows fifteen favorable responses (RED) that GEOINT data naming

conventions were established, while four respondents at least disagreed. Question number 35 shows twelve favorable responses (RED) that GEOINT support integrated mission partner data, while four respondents at least disagreed. Question number 36 shows ten favorable responses (RED) that the GEOINT cell purged irrelevant data, while three respondents at least disagreed. By comparison, table 16 shows that 37.8 percent of the favorable respondents (RED) agreed that GEOINT maintenance was functional, while 7.1 percent of the respondents at least disagreed. Also, the GEOINT cell positively taking control of GEOINT data maintenance, and/or providing guidance could have positively influenced 37.8 percent of the “did not observe” respondents.

Table 16. GEOINT Maintenance

Survey Questions	Did Not Observe	<= Disagree	Neither Agree Nor Disagree	Agree =>	Status
33. Integrate Validated Data	9	0	8	22	Amber
34. Established Data Naming Conventions	14	4	6	15	Red
35. Integrate Mission Partner Data	16	4	7	12	Red
36. Purge Irrelevant Data	20	3	6	10	Red
TOTAL (156)	59	11	27	59	
Percentage	37.8%	7.1%	17.3%	37.8%	RED
Favorable Status: RED (<53%); AMBER (53-79%); and GREEN (80%=>)					

Source: Created by author.

### GEOINT Shared Awareness

GEOINT shared awareness is defined as to coordinate, integrate, employ and modify the capture and sharing of GEOINT data to ensure the common operational

picture and joint intelligence preparation of the operational environment with mission partners. Survey Questions number 37-39 identify GEOINT maintenance functions (see table 17). Question number 37 shows twenty-nine favorable responses (AMBER) for ‘at least agreeing’ (agree and greatly agree) that GEOINT was integrated into the common operational picture, while one respondent ‘at least disagreed’ (disagree and greatly disagree). Question number 38 shows thirty favorable responses (AMBER) that GEOINT was integrated into the joint intelligence preparation of the operational environment (i.e. IPB), while zero respondents at least disagreed. Question number 39 shows twenty-three favorable responses (AMBER) that GEOINT was useable by mission partners, while three respondents at least disagreed. By comparison, table 17 shows that 70.1 percent of the favorable respondents (AMBER) agreed that GEOINT shared awareness was functional, while 3.4 percent of the respondents at least disagreed. Also, the GEOINT cell positively taking control of GEOINT shared awareness, and/or providing guidance could have positively influenced 18 percent of the “neither agree or disagree” respondents.

Table 17. GEOINT Shared Awareness

Survey Questions	Did Not Observe	<= Disagree	Neither Agree Nor Disagree	Agree =>	Status
37. Integrated into COP	4	1	5	29	Amber
38. Integrated into JIPOE (IPB)	3	0	6	30	Amber
39. Useable by Mission Partners	3	3	10	23	Amber
TOTAL (117)	10	4	21	82	
Percentage	8.5%	3.4%	18%	70.1%	AMBER
Favorable Status: RED (<53%); AMBER (53-79%); and GREEN (80%=>)					

*Source:* Created by author.

## GEOINT Enhanced Situational Awareness

GEOINT enhanced SA is defined as to coordinate and employ GEOINT across mission functions in order to achieve and maintain shared awareness of the operational environment with mission partners. Survey Questions number 40-41 identify GEOINT maintenance functions (see table 18). Question number 40 shows twenty-five favorable responses (AMBER) for ‘at least agreeing’ (agree and greatly agree) that GEOINT was available via collaboration tools, while three respondents ‘at least disagreed’ (disagree and greatly disagree). Question number 41 shows twenty-four favorable responses (AMBER) that GEOINT was customized in accordance with mission requirements, while two respondents at least disagreed. By comparison, table 18 shows that 62.8 percent of the favorable respondents (AMBER) agreed that GEOINT enhanced SA, while 6.4 percent of the respondents at least disagreed. Also, the GEOINT cell positively taking control of GEOINT shared awareness, and/or providing guidance could have positively influenced 14.1 percent of the “did not observe” respondents.

Table 18. GEOINT Enhanced Situational Awareness

Survey Questions	Did Not Observe	<= Disagree	Neither Agree Nor Disagree	Agree =>	Status
40. Available via Collaboration Tools	6	3	5	25	Amber
41. Customized IAW Mission Reqt's	5	2	8	24	Amber
TOTAL (78)	11	5	13	49	
Percentage	14.1%	6.4%	16.7%	62.8%	AMBER
Favorable Status: RED (<53%); AMBER (53-79%); and GREEN (80%=>)					

*Source:* Created by author.

## Summary

What are the capabilities and limitations of GEOINT cells in providing understanding and visualization of the common operational picture? The effectiveness of GEOINT Releasability (RED), Emerging Technology (RED), Maintenance (RED), Shared Awareness (AMBER) and Enhanced SA (AMBER) are unfavorable, yet, there are large populations that did not observe them. One way to mitigate this non-observation is that the GEOINT cell be functionally involved in the multinational planning process, to be responsible for the coalition GEOINT annex and to maintain, cultivate and advertise multinational GEOINT integration.

Again, it appears that multinational GEOINT integration has been based on relationship building not on established structure. Yet, it is this exact organizational leadership, responsibility and structure that is required to provide understanding and visualization of the common operational picture. Hopefully, current efforts by the USJFCOM and NATO in establishing a GEOINT Officer and Cell in accordance with a formal manning document (i.e. JMD) will provide understanding and visualization of the common operational picture.

### Secondary Research Question Number 3

Is GEOINT cell stewardship understood and practiced in multinational operations? Secondary research question number three is based on two General Comments (see Appendix C and D). The first general comment is, “What was your most salient story?”, or most important and prominent GEOINT story. The second general comment is, “What was your biggest frustration?”, or unresolved GEOINT problem.

### What Was Your Most Salient Story?

Several stories are discussed as the most salient or most important and prominent GEOINT story, but they tend to follow a degree of shared awareness, planning and operations (see table 19).

Table 19. Salient Story and GEOINT Stewardship Measures

GEOINT Stewardship Measure	Score	Percent
Shared Awareness	9	27.3%
Planning	8	24.2%
Operations	5	15.1%
Enhanced Situational Awareness	4	12.1%
Maintenance	3	9.1%
Emerging Technology	2	6.1%
Releasability	2	6.1%
TOTAL	33	100%

*Source:* Created by author.

First, several respondents replied that shared awareness and planning was the most critical factor in providing multinational GEOINT. One respondent stated that GEOINT was used to track Iraqi Security Police (ISP) development and expansion by station, district, directorate and province. They used GEOINT depicting cultural data by area (geo-cultural) in order to help determine which areas Shi'a Muslim ISP and Sunni Muslim ISP would be most effective to operate within, and to gain insight into issues these different ethnic ISP trainees would have as they traveled to and from ISP training facilities; Shi'a ISP traveling through a Sunni neighborhood, etc. They also used commercial satellite imagery for planning the construction and operation of dislocated



civilian holding areas during combat operations. A second respondent stated they did not have SA of where Iraqi Army and ISP were located, as there were limited Coalition forces partnered with them. At first, they would wait for the translation of Iraqi Army Division situation reports but then discovered they could get quicker confirmation from outside GEOINT reports (i.e. imagery), showing recent Iraqi Army activities. A third respondent stated GEOINT was the critical factor in planning and executing convoy and combat operations with Iraqi Army units. A fourth respondent stated that when a bridge collapsed in Afghanistan, they successfully searched an imagery database for likely bridges, then requested immediate satellite imagery over the selected sites. This quick process aided in a coalition unit quickly going to the site to conduct a bridge reconnaissance.

In addition, one respondent stated that enhanced SA coupled with fused Iraqi Human Intelligence, Measurements and Signals Intelligence, and unclassified satellite imagery indicated unusual movement in Al Anbar Province, Iraq. The respondent said that the fusion of intelligence queued on unclassified satellite imagery allowed Coalition forces to plan and execute an operation that unearthed over 3,000 artillery shells and buried containers full of enemy ammunition. A second respondent said that the integration of emerging technology, such as the regular use of unclassified Buckeye imagery, was incredible and they loved that it was current with high-resolution imagery. A third, respondent stated that as a naval officer they would successfully plan and integrate GEOINT data to enhance SA before entering engagement zones with potential hostile nations. Finally, a fourth respondent said that GEOINT aided in Coalition forces recovering a US killed-in-action (KIA) Soldier's body in Iraq following an ambush.

### What Was Your Biggest Frustration?

Several stories are discussed as the biggest frustration or unresolved GEOINT problem, but they tend to follow a degree of operations, planning, releasability, emerging technology, shared awareness, enhanced SA, then maintenance (see table 20).

Table 20. Biggest Frustration and GEOINT Stewardship Measures

GEOINT Stewardship Measure	Score	Percent
Operations	15	25.4%
Planning	14	23.7%
Releasability	9	15.3%
Emerging Technology	8	13.5%
Shared Awareness	6	10.2%
Enhance Situational Awareness	5	8.5%
Maintenance	2	3.4%
TOTAL	59	100%

*Source:* Created by author.

First, several respondents replied that GEOINT operational understanding, planning considerations and releasability were the critical factors in providing poor multinational GEOINT support. Operational understanding and planning considerations provide a successful GEOINT releasability program. Operational understanding of GEOINT support was the first highly critical frustration. One respondent stated they were currently taking a couple of geospatial courses at CGSC but they wish they knew last year in Iraq what they know today regarding GEOINT as it would have made them a much more effective Battalion Operations Officer (S3). Another respondent stated that at the Infantry battalion level accessing available GEOINT products was frustrating. They understood that GEOINT products exist but they did not understand how to request

GEOINT products in their multinational area of operations. A third respondent stated they never received GEOINT training, nor understood how GEOINT worked and what it could provide. A fourth respondent stated that as a member of a Military Training Team (MiTT), they were not supplied with a GEOINT team, and they did not have the expertise to perform those tasks. A fifth respondent stated they did not have much training before deploying, and they still do not really know what GEOINT is available and how to get it. A sixth respondent stated they did not know how to leverage GEOINT support, especially with limited time and resources. A seventh respondent stated that GEOINT tools come and go fast, and it is difficult to retain experts in units due to operational turnover. Also, that it is often difficult to find the GEOINT leadership to find and exploit those systems. Two additional respondents state that GEOINT does not “sell” themselves very well. They understand that GEOINT can provide much, but do not understand their capabilities, what is available and how to get GEOINT.

Planning considerations of GEOINT support was the second highly critical frustration. The first respondent stated that GEOINT was not directly integrated into the G5 Civil-Military Operations and Planning section. Therefore, those long-range planners who take civilian strategic guidance and apply operational tactics did not properly frame the problem with GEOINT tools to show the human and urban terrain along with the physical and geologic terrain. A second respondent stated that the main problem working at Multi-National Corps-Iraq as a collection manager was the challenge of not having a unified process for units at battalion and brigade level to easily submit collection requirements. Use of spreadsheets (i.e. Excel) was the only means to gather tactical collection requirements for input into service collection systems. A third respondent

stated there were constraints of GEOINT exploitation. Often, analysts were restricted from requesting theater collection assets. Instead, Multi-National Corps-Iraq would simply keep the collection open, therefore overly relying on one sensor (i.e. sensor dominance). On the other hand, during times of bad weather and collection platform (i.e. airborne, satellite) maintenance, analysts could catch up on exploitation and production. A fourth respondent stated it was quite often difficult to divert assets to look at priority sites because the intelligence section often were focused on their specific purposes, and not the operational plan; even though the chain of command declared a change of priority. A fifth respondent stated that the time delay in receiving GEOINT information was frustrating, but they understood they were low on the priority list. They also wished they knew how to plan and integrate GEOINT support better into their operations.

GEOINT Releasability was the third highly critical frustration. Two respondents stated they repeatedly and unsuccessfully tried to get the NGA to grant release authority to Iraqi forces of Limited Distribution GEOINT products but were told they should get release authority from back in theater. Then theater redirected them back to NGA for release. This quite often created a contentious multinational planning environment over existing GEOINT products, denying access to over half of the coalition forces. This lack of operational releasability was not user friendly, nor were the enabling abilities explained well or integrated. A third respondent stated there was too much secrecy surrounding data that did not need to be classified. Also, there was too much data on classified systems that could not, or was not, migrated to unclassified systems. A fourth respondent stated that during the planning for the 2006 Iraqi elections, most of the work was done on SIPRNet (US Military Secret Network) but everyone working on the

elections did not have SIPRNet access. The Iraqi's knew everything about their elections, but the GEOINT data and products created by US forces was not releasable due to the amount of work being executed on SIPRNet. A fifth respondent stated that often US Air Force leadership at the Combined Air Operations Center, Iraq, would not release U-2 airplane imagery to US Army Corps, Tactical Exploitations System (TES), for ground operations. Finally, releasability impacted accessibility and proactiveness by planning staff, as multinational mission partners were not able to access anything except what was handed to them in hardcopy as they did not have the required clearances.

Other points of frustration include compatibility, maintenance, coverage, and automation. Two respondents did mention the severe frustrations with compatibility, currency and coverage gaps of GEOINT data within Command Post of the Future (CPOF), Blue Force Trackers (i.e. FBCB2), and other command and control systems. A third respondent thought it was frustrating not having automated fusion of GEOINT with the other intelligence disciplines and systems. A fourth respondent stated there was a total lack of connectivity between interagency, international, and interservice exploitation and reporting systems.

### Summary

Is GEOINT cell stewardship understood and practiced in multinational operations? The results of this study show that the answer is “No, not at this moment in time.” The previous seven GEOINT stewardship categories help to measure the two general comments. The several frustrating stories highlight the lack of GEOINT operational understanding, planning considerations, and releasability as the critical factors in providing poor multinational GEOINT support. The two divergent questions

highlight when GEOINT support is properly integrated and when it is not properly integrated into multinational operations. When correlated to those 43.6 percent of the operational level of warfare respondents (see table 4), it shows a lack of GEOINT stewardship at operational level of warfare.

Again, it appears that multinational GEOINT integration has been based on hopeful relationship building and not on established structure. Yet, it is this exact organizational leadership, responsibility, and structure that is required to ensure GEOINT cell stewardship is understood and practiced in multinational operations.

#### Primary Research Question

How can GEOINT for multinational operations be made more effective?

GEOINT for multinational operations can be made more effective by enabling, training and exercising GEOINT stewardship. Table 21 identifies the three secondary research questions that showed an overall status of RED in this research.

Table 21. Secondary Research Questions Status

Secondary Research Question	Categories	Status
1. How does GEOINT support decision makers in the contemporary operational environment?	Operations	AMBER
	Planning	RED
2. What are the capabilities and limitations of GEOINT cells in providing understanding and visualization of the COP?	Releasability	RED
	Emerging Technology	RED
	Maintenance	RED
	Shared Awareness	AMBER
	Enhance Situational Awareness	AMBER
3. Is GEOINT cell stewardship understood and practiced in multinational operations?	Most Salient Biggest Frustration	NO

*Source:* Created by author.

First, a multinational coalition must enable GEOINT stewardship at the operational level of warfare, which will establish interoperability standards to overcome ill-structured problems of diverse organizational leadership, structure and resource constraints and limitations. In accordance with the established World Health Organization six-elements of stewardship model (chapter 2, figure 1), the research in this thesis indicates a need for several changes which will ensure GEOINT stewardship performance and assessment are tied together. Figure 4 models reliable, up-to-date information. This new model enhances vision and strategic guidance which influence change across GEOINT and multinational communities. Continuous monitoring and multinational transparency is the centerpiece of GEOINT cell stewardship.

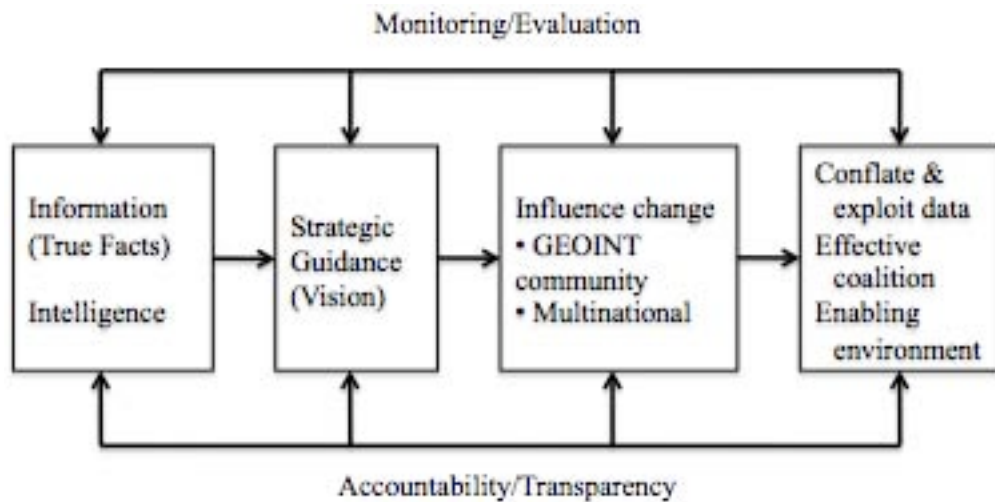


Figure 4. GEOINT Stewardship Model

*Source:* Created by author.

Second, GEOINT stewardship in multinational operations must build capacity by training and exercising early and often, in order to establish GEOINT best practices and standards. This research shows that GEOINT stewardship at the operational level of

warfare must provide the necessary multinational ownership and responsibility to properly develop, utilize and safeguard GEOINT, including its people, its property and its financial assets to maximize the effectiveness for GEOINT cells and the commander.

### Summary

A statistically significant census population participated in the survey research. The census survey was sent to 1,049 CGSC students, out of the 113 students who responded only 39 respondents were qualified to complete the survey. The purpose of this chapter was to explain in detail the survey methodology and conduct a survey of qualified respondents who could address potential multinational gaps in a long-standing intelligence discipline like GEOINT. This chapter presented the survey results collected and identified common and unique themes which surfaced during the survey and general comments. Finally, this chapter presented a GEOINT stewardship model, which ensures GEOINT stewardship performance and assessment are tied together. Chapter 5 will present the researchers conclusions to the analysis, relationships to previous research, suggestions for further research, and recommendations to ensure the development of GEOINT stewardship. The combined effect is to understand the importance of GEOINT stewardship at the operational level of warfare and to assess its role within multinational operations.



## CHAPTER 5

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

This research is based upon existing GEOINT experiences of mid-grade officers in multinational operations, and the reality that they grasp the complexities of multinational operations. It can be inferred that these CGSC mid-grade officers represent the greater population of mid-grade officers. This research seeks to add to the body of knowledge of current unified GEOINT actions through the survey research of 1,049 mid-level officers (and civilians) in the US Army Command and General Staff College class 10-01, at Fort Leavenworth, Kansas. The research seeks to add value to current GEOINT research conducted by numerous international organizations, nations, military services, and other agencies. This GEOINT stewardship also seeks to further GEOINT partnerships, unified and collaborative GEOINT operations, GEOINT source strategies, and GEOINT to the last tactical mile.<sup>69</sup>

#### Primary Research Question.

How can GEOINT for multinational operations be made more effective?

GEOINT for multinational operations can be made more effective by enabling, training and exercising GEOINT stewardship. This research has shown that GEOINT stewardship can positively influence the overall RED survey results in table 22 at the operational level of warfare.

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<sup>69</sup>The National Geospatial-Intelligence Agency. *Pathfinder* 5, no, 1 (January-February 2007): 4.

Table 22. Secondary Research Questions Status

Secondary Research Question	Categories	Status
1. How does GEOINT support decision makers in the contemporary operational environment?	Operations	AMBER
	Planning	RED
2. What are the capabilities and limitations of GEOINT cells in providing understanding and visualization of the COP?	Releasability	RED
	Emerging Technology	RED
	Maintenance	RED
	Shared Awareness	AMBER
	Enhance Situational Awareness	AMBER
3. Is GEOINT cell stewardship understood and practiced in multinational operations?	Most Salient Biggest Frustration	NO

*Source:* Created by author.

First, a multinational coalition must enable GEOINT stewardship at the operational level of warfare, which will establish interoperability standards to overcome ill-structured problems of diverse organizational leadership, structure and resource constraints and limitations. Figure 5 illustrates how GEOINT stewardship performance and assessment are tied together. Continuous monitoring and multinational transparency are the centerpieces of GEOINT cell stewardship.

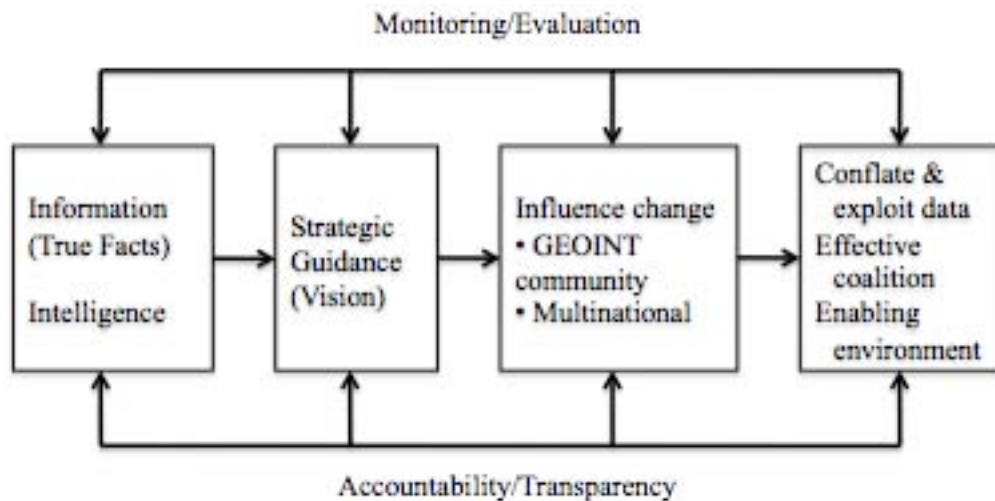


Figure 5. GEOINT Stewardship Model

Source: Created by author.

Second, GEOINT stewardship in multinational operations must build capacity by training and exercising early and often in order to establish GEOINT best practices and standards. This research shows that GEOINT stewardship is needed at the operational level of warfare to provide the necessary multinational ownership and responsibility to properly develop, utilize and safeguard GEOINT, including its people, its property and its financial assets to maximize the effectiveness for GEOINT cells and the commander.

No survey respondent directly stated that GEOINT stewardship was critical to multinational operations. Yet, all respondents did respond that GEOINT must be properly planned, released and executed for multinational operations to be effective (see Appendix B). The respondents did not recommend any specific GEOINT parameters for evaluation. GEOINT cells must do more than simply abide by USJFCOM parameters to effectively operate in a multinational environment. It is this research that proposes GEOINT cell's stewardship is critical to the success of multinational operations. As such, the GEOINT

cell will have stewardship of the responsibility to properly develop, utilize and safeguard GEOINT, including its people, its property, and its financial assets to maximize the effectiveness for the commander. To accomplish GEOINT stewardship, a multinational coalition must quickly respond to their customers' operational level of warfare GEOINT needs with the best technology and information available. The GEOINT cell must exercise this stewardship through a shared vision that will enhance their capability to effectively address GEOINT requirements, focus internal and external research and development efforts, pursue economies in acquisition, and develop approaches to improve information sharing.

With GEOINT stewardship, multinational operations and planning are postured to better frame the problem. GEOINT stewardship enables users to apply critical and creative visualization to situational understanding, and provide context and orientation to solve ill-structured problems. GEOINT stewardship is not tied to any specific systems architecture and thus the GEOINT cell is able to adjust to persistent conflict and the evolving character of conflict in order to provide context. GEOINT cell stewardship enables users to provide critical thinking, share awareness of the operational environment, solve the right problems, adapt to dynamic conditions and achieve designated goals.<sup>70</sup>

Of the 1,049 CGSC students sent the survey, 113 students responded to the survey, and 39 respondents qualified as having GEOINT experience in multinational

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<sup>70</sup>Headquarters, Department of the Army, Field Manual (FM) 5-0, *Operations Process* (Washington, DC: Government Printing Office, 2010), 3-1.

operations. Also, it can be assumed that respondents with multiple deployments would have better GEOINT SA and understand how they impact multinational operations.

#### Secondary Research Question Number 1

How does GEOINT support decision makers in the contemporary operational environment? Multinational GEOINT support has been based on relationship building, not on established structure. It is the individual leadership and education abilities of current augmented teams that have overcome insurmountable odds to provide multinational SA for decision makers. This question is assessed by the effectiveness of GEOINT Multinational Operations and GEOINT Multinational Planning. GEOINT Multinational Operations assessment is that there is no clear GEOINT officer or structure, and that a GEOINT officer is a must for GEOINT stewardship to exist. GEOINT personnel are deploying on multinational operations that require a greater degree of mission training than can be provided at home station. GEOINT Multinational Planning assessment is that GEOINT support was successfully planned, while multinational (i.e. civilian, mission partners, foreign nationals) GEOINT support was unsuccessfully planned.

#### Secondary Research Question Number 2

What are the capabilities and limitations of GEOINT cells in providing understanding and visualization of the common operational picture? Multinational GEOINT cells have been based on relationship building, not on established structure. But it is organizational leadership, responsibility and structure that is required to provide understanding and visualization of the common operational picture. This question is

assessed by the effectiveness of GEOINT Releasability, Emerging Technology, Maintenance, Shared Awareness and Enhanced SA. The previous five category assessments are all fairly positive, yet there are large populations that did not observe them. One way to mitigate this non-observation is for the GEOINT cell to be functionally involved in the multinational planning process, to be responsible for the coalition GEOINT annex and, to maintain, cultivate and advertise multinational GEOINT integration.

This validates current efforts by the USJFCOM in establishing a GEOINT Officer and Cell in accordance with a JMD that will provide established organizational structure for the contemporary and future operational environments (see Appendix A).

### Secondary Research Question Number 3

Is GEOINT stewardship understood and practiced in multinational operations? The results of this study show that the answer is “No, not at this moment in time.” Multinational GEOINT cell stewardship has been based on relationship building, not on established structure. It is this exact organizational understanding and practice that is required for multinational operations. The secondary survey question was assessed by asking the respondents two general comments: ‘what was their most salient story?’ and ‘what was their biggest frustration?’ (see Appendix C and D). The several salient stories highlight the important and prominent use of GEOINT for multinational planning and operations, tracking of units, multi-source intelligence fusion, and use of unclassified collection platforms, in order to bring about a high degree of shared awareness, enhanced SA, and integration of emerging technology. On the other hand, the several frustrating stories highlight the lack of GEOINT releasability, operational understanding and

planning considerations as the critical factors in providing poor multinational GEOINT support. The two divergent questions highlight when GEOINT support is properly integrated and when it is not properly integrated into multinational operations.

### Suggestions for Further Research

Not every aspect of GEOINT stewardship could be covered in this thesis. Listed below are some of the topics that fell outside the scope of this research.

First, the GEOINT Stewardship concept needs to be validated by other commands and institutions. They must understand that it is more than a systematic approach for current permissive operational environments (Iraq and Afghanistan). The GEOINT cell must be tied to the commander via a JMD. GEOINT stewardship is the glue that provides that context for multinational operations. Further base lining of the survey against other service CGSC students (Air Force, Navy and USMC) should be encouraged. Base-lining the survey against those close mission partners- Britain, Canada, Australia, New Zealand, and NATO, will provide the multinational context required.

Second, GEOINT stewardship for foreign humanitarian operations, noncombatant evacuation operations, consequence management, peace operations, nation assistance, and recovery operations requires a different level of GEOINT cell experimentation and capacity buildings.

Third, there are numerous complexities dealing with national caveats and their relationships to coalitions, alliances, nations and services, which impact how they could apply GEOINT stewardship. Likewise each entity will apply the fundamentals of GEOINT stewardship differently due to national caveats, strategic guidance, techniques-tactics-procedures (TTPs), and budgetary oversights. Currently the Five-Eye nations

(Australia, Britain, Canada, New Zealand and the US) are predominantly capable of conducting GEOINT and exercising GEOINT stewardship. These five nations have very capable information and intelligence sharing capabilities. Likewise, singular nations like France are capable of conducting GEOINT and exercising GEOINT stewardship. As of July 2009, France decided to return to the military side of NATO, and hopefully will be able to better integrate itself into GEOINT stewardship across multinational operations.

Fourth, GEOINT stewardship may have a higher level of success if applied to a current multinational operational theater (such as Afghanistan), which could provide better utility of SA satisfaction as a rare change to actually do the job that GEOINT experts have spent years training to do. This theory is rationalized by the assumption that GEOINT experts are prepared to permanently insert themselves into a Joint Task Force of Multinational Headquarters, in accordance with JMD or NATO Crisis Establishment (similar to a JMD). In July 2010, the US Army will assign its first US Army officer to a NATO GEOINT billet, which will be located at International Security Assistance Force, Afghanistan. This billeting is long overdue by the US Army to recognize the importance of multinational GEOINT assignments. Also, the survey results did not include officers or civilians who were deployed, or members of a foreign nation's military; therefore, no defensible answer is available.

Fifth, this research just scratches the surface of examining the different GEOINT stewardship requirements at the various levels of GEOINT operations (tactical, operational, strategic and national). Many nations and forces are not able to provide GEOINT at all levels of operations. They in turn often rely on external sources (i.e.



NGA, etc) to augment their internal GEOINT capabilities. Also, these external sources could heavily influence GEOINT force structure in other nations.

Sixth, this research did not estimate or determine what impact GEOINT stewardship would have for a SOIC. The implications are that by pulling the GEOINT cell out of the J2/G2 domain, and moving it into the SOIC might cause certain capabilities to diminish. On the other hand, the GEOINT cell could be better postured to support full-time operational planning if it were a permanent and operational entity.

Seventh, this research does not analyze the strengths or weaknesses of a GEOINT cell that is initialized early for an expeditionary operation (i.e. Tsunami, Haiti, Lebanon, etc). Nor does it compare how this early initialization would have on disciplining the staff and planning process of emerging boards, bureaus, centers, cells and working groups (B2C2WG). The early creation of the GEOINT cell could fully support a multinational force battle rhythm and “encourage creativity and increase organizational agility and adaptability.”<sup>71</sup> Furthermore, early GEOINT cell stewardship might enhance shared situational awareness of the contemporary operational environment by providing careful monitoring and evaluation of multinational transparency.

Finally, this research does not go into the doctrine, organization, training, materiel, leadership, personnel or facility issues associated with a JMD fill for qualified or unqualified personnel. Currently, the US Army is about 15 percent under strength in recruiting officer cadets. This number could impact ground warfare personnel billets,

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<sup>71</sup>Boteler, Dwaine, and Steward Liles. Knowledge Management, US Corps and Multi-National Corps-Iraq. 2009 Army Operational Knowledge Management (AOKM) Conference, 19-23 October 2009. <http://usacac.army.mil/CAC2/bcks/Connected/ConnectedFall2009.html> (accesses 8 may 2010).

particularly with a GEOINT cell that has a JMD requirement. On the other hand, defense civilians may be able to fill the JMD GEOINT officer billet, if qualified.

### Recommendations

The USJFCOM effort to develop the GEOINT cell is a step in the right direction and helps in building a culture of support for shared operational level of warfare SA. It takes more than regulations to modify human behavior. The culture within the defense forces needs to change which will take positive leadership. It will demands nations and services to accept GEOINT as a comprehensive discipline, and GEOINT stewardship to guide multinational operations to overcome obstacles and initiate change, rather than the suppression of it, for perceived agency or external organizational gains.

The USJFCOM GEOINT cell experimentations have repeatedly demonstrated their ability to provide increased SA. Nations and services must be obliged to adopt GEOINT cells and demonstrate the willingness to address multinational SA with current resources. Likewise, depending on the depth and degree of the JTF mission, the GEOINT Cell, if set up early, can enlarge in size for missions with increased operational environment exploitation (i.e. Tsunami, Haiti, etc), or increase in GEOINT Officer civil-military planning expertise at higher levels of operations. The GEOINT Cell will help solve the shared SA that a multinational operation will require in a non-permissive environment. It is the enabling, training and exercising of GEOINT stewardship and relationship building at the multinational, operational level that is needed.

Servicemen and women will always be the ‘heart and soul’ of the defense forces. Technology, doctrine, techniques, tactics and procedures will change, but sharing a common operational picture is what makes the US unique from all other defense forces in

the world. USJFCOM must lead, enable, train and exercise changes in how Soldiers and civilians view the battlefield, reinforce and the importance of GEOINT stewardship for multinational operations.

## GLOSSARY

- ABCA. Army cooperation between American, Britain, Canada, Australia, and New Zealand. To optimize ABCA Armies' interoperability in order to deliver success on coalition operations. ([www.abca-armies.org](http://www.abca-armies.org))
- Alliance. A relationship that results from a formal agreement or treaty between two or more nations or broad, long-term objectives that further the common interests of the members. (JP 3-0)
- Battle Command. The art and science of understanding, visualizing, describing, directing, leading, and assessing forces to impose the commander's will on a hostile, thinking and adaptive enemy (or threats). (FM 5-0)
- CGSC. The US Army Command and General Staff College (CGSC), located at Fort Leavenworth, Kansas. It educates and develops mid-level (field grade) military and civilian officers for full spectrum joint, interagency and multinational operations; acts as lead agent for the Army's leader development program; and advances the art and science of the profession of arms in support of Army operational requirements. ([www.cgsc.edu](http://www.cgsc.edu))
- Coalition. Is an adhoc arrangement between two or more nations for common action. (JP 5-0)
- Coalition Action. Is a multinational action outside the bounds of established alliances, usually for single occasions or longer cooperation in a narrow sector of common interest. (JP 5-0)
- Combined. Between two or more forces or agencies of two or more allies. (JP 1-02)
- Common Operational Picture. A single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative planning and assists all echelons to achieve situational awareness. (JP 3-0)
- Contemporary Operational Environment. The Operational Environment replaced the term battlespace. The contemporary operational environment (COE) is the overall operational environment that exists today and in the near future (out to the year 2020). The range of threats during this period extends from smaller, lower-technology opponents using more adaptive, asymmetric methods to larger, modernized forces able to engage deployed U.S. forces in more conventional, symmetrical ways. In some possible conflicts (or in multiple, concurrent conflicts), a combination of these types of threats could be especially problematic. ([www.strategypage.com](http://www.strategypage.com))

Ends-Ways-Means. While each plan is unique, all plans seek a balance for combining ends, ways, and means against risk. Ends are the desired conditions of a given operation. Ways are actions to achieve the end state. Means are the resources required to execute the way. (JP 5-0)

Five-Eyes (5-Eyes). National intelligence cooperation between Australia, Britain, Canada, New Zealand and the United States; frequently called “Commonwealth Sharing”. ([www.dni.gov](http://www.dni.gov), also see bibliography)

Geospatial Intelligence. There is no universally acceptable definition for GEOINT. Nearly every member of NATO and ABCA defines GEOINT differently as each nation applies platforms, collection and exploitation to varying degrees. Unofficial Wikipedia definition: an intelligence discipline comprising the exploitation and analysis of geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth. GEOINT data sources include imagery and mapping data, whether collected by commercial or government satellites, manned/unmanned aircraft, and ground-truthed (absolutely verified) by demographic (i.e. census, cultural intelligence) information, global positioning systems (GPS) waypoints, utility schematics, or any discrete data that have locations on Earth. (Wikipedia)

Geospatial Intelligence (Australia). Geospatial Intelligence is intelligence derived from the exploitation and analysis of imagery and geospatial information about features and events with reference to time and location. ([www.defence.gov.au/digo](http://www.defence.gov.au/digo))

Geospatial Intelligence (Canada). Geospatial Intelligence is the exploitation and analysis of imagery (all kinds) and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth and is provided as an element of a fused product. It consists of imagery, imagery intelligence, geospatial, meteorological and oceanographic information. ([www.cdi-crd.forces.gc.ca](http://www.cdi-crd.forces.gc.ca))

Geospatial Intelligence (European Union). The term GEOINT stands for GEOspatial INTelligence, which is a discipline that comprises the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth. ([www.eusc.europa.eu](http://www.eusc.europa.eu))

Geospatial Intelligence (NATO). NATO currently has two GEOINT definitions, which are slightly in conflict with each other, and has asked the NATO Standards Agency (NSA) to agree on a single definition. First definition: Geospatial intelligence is the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth”. ([www.nato.int](http://www.nato.int), AJP 2.1, paragraph 0270) Second definition: Geospatial intelligence is the outcome of the combination of quality-assured geospatial information with verified feature data of the military

intelligence or other intelligence sources for compliance with a requirement. Geospatial intelligence consists of imagery intelligence and geospatial information”. (www.nato.int, MC 0128/6, Annex D, May 2007.)

Geospatial Intelligence (New Zealand). Geospatial intelligence (GEOINT) is defined as intelligence derived from the exploitation and analysis of integrated imagery and geospatial information about features and activities of defence, security or foreign intelligence interest, viewed in the context of location and time. (www.nzdf.mil.nz/jgsf)

Geospatial Intelligence (United Kingdom). The United Kingdom does not define GEOINT in the classical sense, the UK Intelligence Collection Group (ICG) separates and controls the components of GEOINT to different national and defence agencies. (www.mod.uk)

Geospatial Intelligence (United Nations). The UN does not use the term GEOINT, instead it identifies geospatial information, remote sensing and imagery analysis in terms of Open Source collection, exploitation, and production for members nations, of environmental, weapons and disaster monitoring, verification and inspection. (www.un.org)

Geospatial Intelligence (United States). Geospatial intelligence is the exploitation and analysis of imagery and geospatial information to describe, assess and visually depict physical features and geographically referenced activities on the Earth. Geospatial intelligence consists of imagery, imagery intelligence and geospatial (e.g., mapping, charting and geodesy) information. (www.nga.mil)

GEOINT Stewardship. Is defined as the responsibility to properly develop, utilize and safeguard GEOINT, including its people, its property and its financial assets to maximize the effectiveness for GEOINT cells and the commander. GEOINT data is a resource that has established collection and exploitation processes, financial value, and legal oversights. Altogether, GEOINT stewardship has three functions: formulating GEOINT policy; exerting influence; and collecting and using GEOINT. (Wikipedia)

GEOINT Support Team. NGA has been at the forefront of providing consistent forward geospatial intelligence (GEOINT) support to the warfighter through its network of deployed GEOINT Support Teams (GSTs). (www.nga.mil)

International Security Assistance Force. ISAF is a NATO-led security mission in Afghanistan established by the United Nations Security Council on 20 December 2001 as envisaged by the Bonn Agreement. in support of the Government of the Islamic Republic of Afghanistan, conducts operations in Afghanistan to reduce the capability and will of the insurgency, support the growth in capacity and capability of the Afghan National Security Forces (ANSF), and facilitate improvements in governance and socio-economic development, in order to

- provide a secure environment for sustainable stability that is observable to the population. ([www.isaf.nato.int](http://www.isaf.nato.int))
- Joint Intelligence Support Element.** A JISE is a subordinate joint force element whose focus is on intelligence support for joint operations, providing the joint force commander, joint staff, and components with the complete air, space, ground, and maritime adversary situation. (JP 2-01)
- Joint/Multiservice.** Connotes activities, operations, organizations, etc., in which elements of two or more Military Departments participate. (JP 1-02)
- Joint Task Force.** A joint task force is constituted and so designated by the Secretary of Defense, a combatant commander, a sub-unified commander, or an existing joint task force commander. (JP 1-02)
- Knowledge Management.** Is the action of creating, organizing, applying, and transferring knowledge to facilitate situational understanding and decision making. Knowledge management supports improving organizational learning, and performance. Knowledge management processes ensure that knowledge products and services are relevant, accurate, timely, and useable to commanders and decision makers. Knowledge management has three major components — people, processes, and technology. (FM 3-0)
- Littoral.** Commonly referred to as that part of a sea, lake, or river, between the high water mark and the low water mark. This is the zone that directly impacts amphibious operations. The littoral comprises two segments of operational environment: Seaward, they are from the open ocean to the shore, which must be controlled to support operations ashore; Landward, the area inland from the shore that can be supported and defended directly from the sea. (JP 1-02)
- Multinational.** Between two or more forces or agencies of two or more nations or coalition partners. (JP 5-0)
- National Caveats.** National restrictions placed by nations on the use of national military contingents operating as part of a multinational operation. These caveats can restrict NATO commanders by limiting their flexibility to respond to situations on the ground. For this reason, the Alliance seeks national contributions with as few caveats as possible. ([www.nato.int](http://www.nato.int))
- NATO.** The North Atlantic Treaty Organization (NATO) is an alliance of 28 countries from North America and Europe committed to fulfilling the goals of the North Atlantic Treaty signed on 04 April 1949. ([www.nato.int](http://www.nato.int))
- NGA Support Team.** NSTs are vital to the GEOINT products NGA provides. These teams serve as direct, embedded support to national and international level agencies, and combatant commands on a global scale, providing these decision-

makers with the analysis and tools that help shape decisions affecting the battlespace. ([www.nga.mil](http://www.nga.mil))

**Operational Environment.** Is a composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (JP 1-02)

**Situational Awareness.** The immediate knowledge of the conditions of the operation, constrained geographically and in time. More simply, it is Soldiers knowing what is currently happening around them. SA occurs in Soldier's minds. It is not a display or the common operational picture; it is the interpretation of displays or the actual observation of a situation. On receipt of mission, commanders develop their SA. They have it on information and knowledge products, such as the common operational picture and running estimates. (FM 3-0)

**Situational Understanding.** Is the product of applying analysis and judgment to relevant information to determine the relationships among the mission variables to facilitate decisionmaking. It enables commanders to determine the implications of what is happening and forecast what may happen. SU enhances decision making by identifying opportunities, threats to the force or mission accomplishment, and information gaps. It helps commanders identify enemy options and likely future actions, the probable consequences of proposed friendly actions, and the effect of the operational environment on both. SU based on a continuously updated common operational picture fosters individual initiative by reducing, although not eliminating, uncertainty. (FM 3-0)

**Stability Operations Information Center.** Afghanistan, Regional Command – West (RC-West) argues that SOIC is the type of organization that is capable of institutionalizing the concepts and processes described in TRADOC Pam 525-5-500 toward greater understanding, not just during operational design, but also during campaign planning and the execution of operations in the contemporary operational environment. (SOIC article, see bibliography)

**Stewardship.** Conducting, supervising, or managing of an object, field or discipline; particularly the careful and responsible management of something entrusted to one's care. Applied as organizational stewardship, it refers to a leader's responsibility to properly utilize, develop and share its resources, including its people, its property and its financial assets, while still protecting the security of these resources. ([www.dictionary.com](http://www.dictionary.com))

**Subordinate Unified Command.** A command established by commanders of unified commands, when so authorized by the Secretary of Defense through the Chairman of the Joint Chiefs of Staff, to conduct operations on a continuing basis in accordance with the criteria set forth for unified commands. A subordinate unified command may be established on an area or functional basis. Commanders of subordinate unified commands have functions and responsibilities similar to those



of the commanders of unified commands and exercise operational control of assigned commands and forces within the assigned operational area. (JP 1-02)

Unified Action. The synchronization, coordination, and/or integration of, the activities of governmental and nongovernment entities with military operations to achieve unity of effort. (JP 1-02)

Unified Command/Unified Combatant Command. A command with a broad continuing mission under a single commander and composed of significant assigned components of two or more Military Departments that is established and so designated by the President, through the Secretary of Defense with the advice and assistance of the Chairman of the Joint Chiefs of Staff. (JP 1-02)

Unified GEOINT Operations. UGO has moved GEOINT support from a “need to know” to a “need to share” construct. UGO is a collaborative and coordinated effort to assess, align and execute GEOINT analysis and production across the NSG and its partner organizations. UGO is based on shared responsibility and trust to optimize GEOINT capabilities in a rationally prioritized, needs-based approach to analysis and production. ([www.nga.mil](http://www.nga.mil))

Unity of Effort. Coordination and cooperation toward common objectives, even if the participants are not necessarily part of the same command or organization; the product of successful unified action. (JP 1-02)

## APPENDIX A

### DOTMLPF CHANGE RECOMMENDATION ACTION

DOTMLPF Category	Action	Suspense Date	Completed
Doctrine	1. Conduct an early assessment of joint GEOINT doctrine execution (tactics, techniques and procedures (TTP), JP 2-03)	3Q FY 2009	YES
Doctrine	2a. Determine the composition and functions of a GEOINT cell through experimentation. USJFCOM to list composition and functions of GEOINT cell in a report to be delivered to the Community GEOINT Training Council (CGTC).	3Q FY 2009	YES
Doctrine	2b. Determine if the GEOINT cell composition and functions require a separate cell or can be absorbed into other JTF cells. USJFCOM to brief this determination to CGTC.	1Q FY 2010	
Doctrine	2c. Document GEOINT TTP and submit to J7 to revise doctrine per CJCSI 5120.02A.	1Q FY 2010	
Training	3. Perform study in coordination with combatant commands, Services and NGA to recommend joint GEOINT skill sets for GEOINT officers and GEOINT cell members. USJFCOM to deliver study to CGTC.	3Q FY 2009	YES
Training	4. Recommend, determine, develop, refine and maintain joint GEOINT training curriculum supporting GEOINT officer and GEONT cell. NGA to provide recommendations on training curriculum to CGTC.	3Q FY 2010	
Organization	5. Validate functions of personnel necessary for GEOINT cell based on results of Action 2a. Joint Staff J2 will utilize the Joint Staff Action Package (JSAP) process to obtain concurrent from combatant commands, Services and NGA to validate the functions of personnel in a GEOINT cell.	1Q FY 2010	

Organization	6a. Begin establishment of a GEOINT staff officer at the combatant commands and Joint Staff. Each combatant command and Joint Staff will identify staff positions using combatant command and Joint Staff manpower.	1Q FY 2010	
Organization	6b. Identify the functions of a GEOINT officer based on results from Action 3. Joint Staff J2 will utilize the Joint Staff Action Package (JSAP) process to obtain concurrence from combatant commands, Services and NGA to validate the functions identified for a GEONT officer.	1Q FY 2010	
Organization	6c. Determine if the GEOINT officer responsibilities require dedicated GEOINT officers or can be added to the skills of existing GEOINT personnel located at the combatant commands. Joint Staff J2 will utilize the Joint Staff Action Package (JSAP) process to obtain concurrence from combatant commands, Services and NGA to validate this determination.	1Q FY 2010	
Leadership & Education	7. Recommend joint GEOINT curriculum be established in joint professional military education through the Special Area Emphasis (SAE) process. USJFCOM will submit recommendations to J7 per the SAE process.	2Q FY 2009	
Leadership & Education	8. Establish an online community collaboration forum on each security domain to share resources and best practices. NGA to establish online forums.	3Q FY 2009	

*Source:* Department of Defense, Memorandum, Subject: Joint Geospatial Intelligence Transformation DOTMLPF Change Recommendation, Washington, DC, 25 June 2008.

## APPENDIX B

### SURVEY CONTROL Number 10-050

<b>DEVELOP GEOINT STEWARDSHIP FOR MULTINATIONAL OPERATIONS</b>			
Survey Questions	Answers	Count	Percent
<b>QUALIFIER</b>			
Have you requested or provided GEOINT on a multinational operation?	Yes	39	34.5%
	No	74	65.5%
	<b>TOTAL</b>	<b>113</b>	<b>100.0%</b>
<b>DEMOGRAPHICS</b>			
1. Please specify your highest level (scale) of GEOINT operation?	National	8	20.5%
	Strategic/State/County	7	17.9%
	Operational/Joint Task Force/County/City	17	43.6%
	Tactical/Community	6	15.4%
	Other	1	2.6%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
2. How many times have you deployed on multinational operation(s)?	1	5	12.8%
	2	15	38.5%
	3	11	28.2%
	4+	8	20.5%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
3. Is your country a member of NATO?	Yes	39	100.0%
	No	0	0.0%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
4. How many times have you deployed on NATO operation(s)?	0	12	30.8%
	1	20	51.3%
	2	3	7.7%
	3	3	7.7%
	4+	1	2.6%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>

5. How many times have you deployed to Afghanistan?	0	27	69.2%
	1	10	25.6%
	3	2	5.1%
	TOTAL	39	100.0%
6. What type of formal GEOINT education have you received?	Mission Planning (Command & Control Systems, etc)	10	7.5%
	Geospatial Information (maps, terrain analysis, shapefiles, vectors, etc)	21	15.8%
	Imagery (processing, science, IR, MSI/HSI, etc)	11	8.3%
	Imagery Intelligence (analysis, ORBAT, etc)	11	8.3%
	Radar, IFSAR, MTI/GMTI, LIDAR, etc	10	7.5%
	Full Motion Video	10	7.5%
	Survey/gravitational/magnetic	4	3.0%
	Network Analysis (human, signals, infrastructure, etc)	6	4.5%
	Cultural intelligence layers/Human terrain team	4	3.0%
	Targeting	11	8.3%
	Intelligence, surveillance, and reconnaissance collection management	13	9.8%
	Space	5	3.8%
	Maritime	1	0.8%
	Littoral	2	1.5%
	None	14	10.5%
	TOTAL	133	100.0%
7. What is the highest level of GEOINT education you received?	University/college level education (Remote Sensing, GIS, Analysis, etc)	2	5.1%
	Military Occupation Specialty/Civilian Skill (4+ weeks)	2	5.1%
	Long course (2-4 weeks)	2	5.1%
	Short course (1-7 days)	5	12.8%
	Received education but not certain of the level	10	25.6%

	None	17	43.6%
	Other	1	2.6%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
8. How would you characterize your personal level of knowledge regarding GEOINT support for multinational operation(s)?	Limited- Based largely on anecdotal information.	9	23.1%
	Average- Developed from training or operational support.	21	53.8%
	Above Average- Developed from training AND operational support.	7	17.9%
	Detailed- Supervised multinational support, developed from formal training AND operational support	2	5.1%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
	<b>GEOINT MULTINATIONAL OPERATIONS</b>		
9. What type of multinational operation(s) did you support?	Major Operations	24	15.1%
	Homeland Defense/Internal Security	3	1.9%
	Civil Support	8	5.0%
	Strikes	9	5.7%
	Raids	9	5.7%
	Show of Force	5	3.1%
	Enforcement of Sanctions	5	3.1%
	Protection of Shipping	2	1.3%
	Freedom of Navigation	2	1.3%
	Peace Operations	12	7.5%
	Support to Insurgency	2	1.3%
	Counterinsurgency Operations	23	14.5%
	Combating Terrorism	16	10.1%
	Noncombatant Evacuation Operations	4	2.5%
	Recovery Operations	5	3.1%
	Consequence Management	3	1.9%
	Foreign Humanitarian Assistance	6	3.8%
	Nation Assistance	6	3.8%
	Arms Control and Disarmament	3	1.9%

	Routine, Recurring Military Activities	11	6.9%
	Other	1	0.6%
	<b>TOTAL</b>	<b>159</b>	<b>100.0%</b>
10. What type of GEOINT support did your multinational operation(s) require?	Mission Planning (Command & control systems, etc)	21	11.5%
	Geospatial Information (maps, terrain analysis, ground truth locations, etc)	27	14.8%
	Imagery (processing, science, IR, MSI/HSI, etc)	23	12.6%
	Imagery Intelligence (analysis, ORBAT, etc)	19	10.4%
	Radar, IFSAR, MTI/GMTI, LIDAR, etc	7	3.8%
	Full Motion Video	11	6.0%
	Survey, GPS		
	foundation/benchmark, gravitational, magnetic	3	1.6%
	Network Analysis (human, signals, infrastructure, etc)	11	6.0%
	Cultural intelligence layers/Human terrain teams	15	8.2%
	Targeting	20	11.0%
	Intelligence, surveillance, and reconnaissance collection management	16	8.8%
	Space	3	1.6%
	Maritime	3	1.6%
	Littoral	3	1.6%
	<b>TOTAL</b>	<b>182</b>	<b>100.0%</b>
11. My unit's GEOINT operations were established according to the commander's concept of operations:	Strongly Agree	6	15.4%
	Agree	17	43.6%
	Agree	17	43.6%

	Neither Agree Nor Disagree	7	17.9%
	Disagree	4	10.3%
	Strongly Disagree	1	2.6%
	Did Not Observe	4	10.3%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
12. My unit's GEOINT operations were integrated into our mission:	Strongly Agree	6	15.4%
	Agree	25	64.1%
	Neither Agree Nor Disagree	4	10.3%
	Disagree	1	2.6%
	Strongly Disagree	1	2.6%
	Did Not Observe	2	5.1%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
13. My unit's GEOINT officer was integrated into the our mission:	Strongly Agree	5	12.8%
	Agree	17	43.6%
	Neither Agree Nor Disagree	7	17.9%
	Disagree	1	2.6%
	Strongly Disagree	0	0.0%
	Did Not Observe	9	23.1%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
14. My unit's GEOINT cell was synchronized with our battle rhythm:	Strongly Agree	4	10.3%
	Agree	18	46.2%
	Neither Agree Nor Disagree	7	17.9%
	Disagree	1	2.6%
	Strongly Disagree	2	5.1%
	Did Not Observe	7	17.9%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>GEOINT MULTINATIONAL PLANNING</b>			
15. My unit's GEOINT officer prioritized GEOINT mission requirements during the planning process:	Strongly Agree	4	10.3%
	Agree	17	43.6%



	Neither Agree Nor Disagree	8	20.5%
	Disagree	1	2.6%
	Strongly Disagree	0	0.0%
	Did Not Observe	9	23.1%
	TOTAL	39	100.0%
16. My unit coordinated multinational GEOINT collection strategy methods:			
	Strongly Agree	5	12.8%
	Agree	10	25.6%
	Neither Agree Nor Disagree	11	28.2%
	Disagree	2	5.1%
	Strongly Disagree	1	2.6%
	Did Not Observe	10	25.6%
	TOTAL	39	100.0%
17. GEOINT products were useful towards my unit's mission:			
	Strongly Agree	11	28.2%
	Agree	25	64.1%
	Neither Agree Nor Disagree	0	0.0%
	Disagree	1	2.6%
	Strongly Disagree	0	0.0%
	Did Not Observe	2	5.1%
	TOTAL	39	100.0%
18. My unit's planning staff understood GEOINT planning considerations:			
	Strongly Agree	5	12.8%
	Agree	18	46.2%
	Neither Agree Nor Disagree	6	15.4%
	Disagree	8	20.5%
	Strongly Disagree	1	2.6%
	Did Not Observe	1	2.6%
	TOTAL	39	100.0%
19. My unit's intelligence section/staff understood GEOINT planning considerations:			
	Strongly Agree	7	17.9%
	Agree	17	43.6%
	Neither Agree Nor Disagree	8	20.5%
	Disagree	4	10.3%

	Strongly Disagree	1	2.6%
	Did Not Observe	2	5.1%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>20. My unit's engineer section/staff understood GEOINT planning considerations:</b>			
	Strongly Agree	3	7.7%
	Agree	17	43.6%
	Neither Agree Nor Disagree	7	17.9%
	Disagree	1	2.6%
	Strongly Disagree	1	2.6%
	Did Not Observe	10	25.6%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>21. My unit's civil-military operations section/staff understood GEOINT planning considerations:</b>			
	Strongly Agree	1	2.6%
	Agree	8	20.5%
	Neither Agree Nor Disagree	13	33.3%
	Disagree	4	10.3%
	Strongly Disagree	3	7.7%
	Did Not Observe	10	25.6%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>22. Other mission partners could visualize my unit's GEOINT support:</b>			
	Strongly Agree	3	7.7%
	Agree	8	20.5%
	Neither Agree Nor Disagree	13	33.3%
	Disagree	8	20.5%
	Strongly Disagree	1	2.6%
	Did Not Observe	6	15.4%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>23. My unit's priority intelligence requirements were synchronized with our GEOINT collection strategy:</b>			
	Strongly Agree	4	10.3%
	Agree	14	35.9%
	Neither Agree Nor Disagree	12	30.8%
	Disagree	5	12.8%
	Strongly Disagree	1	2.6%

	Did Not Observe	3	7.7%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>24. My unit's foreign national intelligence requirements were synchronized with our GEOINT collection strategy:</b>			
	Strongly Agree	1	2.6%
	Agree	7	17.9%
	Neither Agree Nor Disagree	11	28.2%
	Disagree	11	28.2%
	Strongly Disagree	1	2.6%
	Did Not Observe	8	20.5%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>GEOINT MULTINATIONAL RELEASABILITY</b>			
<b>25. My unit coordinated multinational GEOINT releasability in accordance with mission requirements:</b>			
	Strongly Agree	4	10.3%
	Agree	13	33.3%
	Neither Agree Nor Disagree	7	17.9%
	Disagree	4	10.3%
	Strongly Disagree	0	0.0%
	Did Not Observe	11	28.2%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>26. My unit disseminated GEOINT layers to mission partners:</b>			
	Strongly Agree	3	7.7%
	Agree	19	48.7%
	Neither Agree Nor Disagree	5	12.8%
	Disagree	7	17.9%
	Strongly Disagree	0	0.0%
	Did Not Observe	5	12.8%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>27. My unit established standard web search parameters to release GEOINT support:</b>			
	Strongly Agree	3	7.7%
	Agree	9	23.1%
	Neither Agree Nor Disagree	10	25.6%
	Disagree	4	10.3%

	Strongly Disagree	0	0.0%
	Did Not Observe	13	33.3%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>28. My unit mitigated GEOINT area-coverage gaps:</b>			
	Strongly Agree	4	10.3%
	Agree	9	23.1%
	Neither Agree Nor Disagree	11	28.2%
	Disagree	4	10.3%
	Strongly Disagree	1	2.6%
	Did Not Observe	10	25.6%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>29. My unit coordinated GEOINT capabilities with external mission partners to satisfy our mission requirements:</b>			
	Strongly Agree	3	7.7%
	Agree	17	43.6%
	Neither Agree Nor Disagree	7	17.9%
	Disagree	3	7.7%
	Strongly Disagree	1	2.6%
	Did Not Observe	8	20.5%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>GEOINT EMERGING TECHNOLOGY</b>			
<b>30. My unit integrated emerging GEOINT technology with mission partners:</b>			
	Strongly Agree	2	5.1%
	Agree	13	33.3%
	Neither Agree Nor Disagree	10	25.6%
	Disagree	3	7.7%
	Strongly Disagree	1	2.6%
	Did Not Observe	10	25.6%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>31. My unit coordinated training for these emerging GEOINT technologies:</b>			
	Strongly Agree	3	7.7%
	Agree	10	25.6%
	Neither Agree Nor Disagree	12	30.8%
	Disagree	3	7.7%
	Strongly Disagree	1	2.6%

	Did Not Observe	10	25.6%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>32. Introducing this new GEOINT technology enhanced my unit's situational awareness:</b>			
	Strongly Agree	4	10.3%
	Agree	13	33.3%
	Neither Agree Nor Disagree	10	25.6%
	Disagree	0	0.0%
	Strongly Disagree	0	0.0%
	Did Not Observe	12	30.8%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>GEOINT MAINTENANCE</b>			
<b>33. My unit validated GEOINT data for accuracy in accordance with mission requirements:</b>			
	Strongly Agree	4	10.3%
	Agree	18	46.2%
	Neither Agree Nor Disagree	8	20.5%
	Disagree	0	0.0%
	Strongly Disagree	0	0.0%
	Did Not Observe	9	23.1%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>34. My unit established GEOINT data naming conventions:</b>			
	Strongly Agree	3	7.7%
	Agree	12	30.8%
	Neither Agree Nor Disagree	6	15.4%
	Disagree	4	10.3%
	Strongly Disagree	0	0.0%
	Did Not Observe	14	35.9%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>35. My unit integrated mission partners GEOINT data into sharable GEOINT holdings:</b>			
	Strongly Agree	2	5.1%
	Agree	10	25.6%
	Neither Agree Nor Disagree	7	17.9%
	Disagree	3	7.7%
	Strongly Disagree	1	2.6%
	Did Not Observe	16	41.0%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>

36. My unit purged GEOINT databases of irrelevant data:	Strongly Agree	1	2.6%
	Agree	9	23.1%
	Neither Agree Nor Disagree	6	15.4%
	Disagree	3	7.7%
	Strongly Disagree	0	0.0%
	Did Not Observe	20	51.3%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>GEOINT SHARED AWARENESS</b>			
37. My unit integrated GEOINT layers into the common operational picture:	Strongly Agree	6	15.4%
	Agree	23	59.0%
	Neither Agree Nor Disagree	5	12.8%
	Disagree	1	2.6%
	Strongly Disagree	0	0.0%
	Did Not Observe	4	10.3%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
38. My unit integrated GEOINT layers into the joint intelligence preparation of the operational environment (i.e. IPB):	Strongly Agree	8	22.9%
	Agree	19	54.3%
	Neither Agree Nor Disagree	5	14.3%
	Disagree	0	0.0%
	Strongly Disagree	0	0.0%
	Did Not Observe	3	8.6%
	<b>TOTAL</b>	<b>35</b>	<b>100.0%</b>
39. GEOINT was usable by mission partners:	Strongly Agree	3	7.7%
	Agree	20	51.3%
	Neither Agree Nor Disagree	10	25.6%
	Disagree	2	5.1%
	Strongly Disagree	1	2.6%
	Did Not Observe	3	7.7%
	<b>TOTAL</b>	<b>39</b>	<b>100.0%</b>
<b>GEOINT ENHANCED SITUATIONAL AWARENESS</b>			

40. GEOINT was available via collaboration tools (i.e. web, CPOF, Blue Force Tracker, etc):	Strongly Agree	7	17.9%
	Agree	18	46.2%
	Neither Agree Nor Disagree	5	12.8%
	Disagree	1	2.6%
	Strongly Disagree	2	5.1%
	Did Not Observe	6	15.4%
	TOTAL	39	100.0%
41. GEOINT was customized to support my unit's mission requirements:	Strongly Agree	5	12.8%
	Agree	19	48.7%
	Neither Agree Nor Disagree	8	20.5%
	Disagree	1	2.6%
	Strongly Disagree	1	2.6%
	Did Not Observe	5	12.8%
	TOTAL	39	100.0%

## APPENDIX C

### RAW: SURVEY GENERAL COMMENTS

42. What was your most salient story?

We were trying to track Iraqi Army and Police operations with very limited Coalition Forces- they didn't have MiTTs, and we didn't have enough partnered units to be out in the AO with them and see what they were doing. After a few days, I found that the MNC- I was getting updates on my Iraqi Division's activities by comparing photographs of positions- it was usually 24 hours old, but more current than the translation of situation reports I was getting from the Iraqi Division, and a good way to confirm them.

GEOINT was not directly integrated into the G5 section. Therefore, long range planners did not properly frame the problem with GEOINT tools to show the human and urban terrain along with the physical and geologic terrain.

Recovery of body in Iraq from an ambush.

MASINT, SIGINT, and satellite imagery indicated unusual movement at unusual hours in my company AO in Al Anbar in 2005. We acted on the intel, and as a result unearthed over 3000 artillery shells and buried milvans full of other enemy ammunition.

My unit utilized ARCGIS to track progress of Iraqi Police development and expansion by station, district, directorate and province. We used Geospatial products depicting cultural data by area in order to help determine which areas shia versus sunni IPs would be most effective and to gain insight into issues IP trainees would have as they travelled to and from IP training facilities (ex. Shia trainee travelling through Sunni neighborhoods). We also used satellite imagery during planning for the erection and operation of dislocated civilian holding areas during combat operations.

Loved and used buckey regularly.

GeoInt was the critical factor in destroying the target and conducting the raid that my unit executed.

Main problem working at MNC-I as a collection manager was the challenge of not having a cradle to grave ability for units at battalion/brigade level to easily submit requirements for collection. Use of spreadsheets was the only means to gather requirements for input to PRISM for USAF collection and to Army Assets for collection.

Second, was the lack and refusal of USAF leadership at the CAOC to push U-2 imagery to Corps TES.

We ran daily convoy security missions in Iraq and extensively used imagery (TIGR was a super program) to conduct map recons since we often did not have time for route recons. Color imagery had real value added. We also used imagery from TIGR in our TOC as well as other imagery sources (cannot name them now) to integrate into our TOC and for use with our FBCB2 to monitor and assist convoy commanders with navigation.

Prepping for elections in Iraq - most of the work done on SIPR but everyone working elections did not have SIPR access. The Iraqis knew all about their elections, but the data and products produced was not immediately available due to work being executed on SIPR.



In Afghanistan a report from the HN government stated that a bridge collapsed on the ring road. No U.S. forces were able to independently verify and coalition partners would not do a recon to validate. I searched an imagery database for likely bridges based on the report and my office then coordinated for real time imagery shots of the selected sites. We found the collapsed bridge and some signs of why it collapsed and we then directed a U.S. unit to go to the site and conduct a bridge recon.

As a naval officer, we only requested information when close to hostile nations. Receiving key data prior to entering engagement zones was critical to our effective planning and deployment to maximize our capabilities.

GEOINT was very useful on my last deployment.

43. What were your biggest frustrations with geospatial intelligence operations?

I never really understood how it worked, and what the system can provide. It was never touched on in any training I received, but all learning by experience.

Accessibility and proactiveness.

Trying to get NGA to grant release authority so we could share a product with our Iraqi partners when NGA was the originator. They said we should get release authority from in theater; we were redirected back to the originator! As a member of a MiTT, we were not supplied with a GEOINT TM and we did not have the expertise to perform those tasks.

None really

I was not always sure of the product I needed, especially with limited time and resources

I didn't have much training before deploying, and I still don't really know what all is available and how to get it. More importantly, MN partners were not able to access anything except what I gave them in hardcopy, since they weren't cleared for most of it.

Compatibility, esp with CPOF !!!

Many geospatial products were restricted access/LIMDIS and not very user friendly, especially when denying access to over half our coalition. It was not user friendly nor were the enabling abilities explained well or integrated

No major frustrations.

Need to update imagery within CPOF at CGSC and on BFTs and FBCB2s.

At the Infantry BN tactical level - getting my hands on the products that are available is the most frustrating part. I know that these products exist, but don't seem to rate a priority high enough to get the information (existing information) or understand what channels I need to work through to get new information. i.e. an updated analysis of my AO.

Constraints of exploitation. Often this would be the means to restrict collection from theater assets. It was always the position of MNC-I to collect on imagery and not limit the collection because of exploitation. Reason, weather and maintenance would prevent some flights and analyst could catch up on exploiting imagery during those times.

I am taking a couple of geospatial courses in ILE now as electives. I wish I new last year in Iraq what I know today. I would have been much more effective as a BN S3.

Too much secrecy surrounding data that did not need to be classified. Too much data on classified systems that could not, or was not, migrated to unclassified systems.

Trying to find someone that could inform us what was available and how we could get it.

There is a lot they can provide, but not everyone understands their capabilities... and they do not “sell” themselves very well.

None.

Tools come fast and it is difficult to retain experts in the unit. There are many systems available but finding those assets, or experts, is difficult.

The time delay to receive information was frustrating, but I realized that we were not high on the priority list. Learning to foresee future needs was our work around, which was an effective method of teaching the staff.

Not having automated fusion of GEOINT with other INTs/systems.

Lack of connectivity between interagency, international, and interservice exploitation and reporting systems.

Convincing the intelligence officers to divert assets to look at the sites even though it was declared a priority by the chain of command.

## APPENDIX D

### QUANTIFIED: SALIENT SURVEY COMMENTS

GENERAL COMMENTS	Operations	Planning	Releasability	Emerging Technology	Maintenance	Shared Awareness	Enhance SA	TOTAL
1. We were trying to track Iraqi Army and Police operations with very limited Coalition Forces- they didn't have MiTTs, and we didn't have enough partnered units to be out in the AO with them and see what they were doing. After a few days, I found that the MNC-I was getting updates on my Iraqi Division's activities by comparing photographs of positions- it was usually 24 hours old, but more current than the translation of situation reports I was getting from the Iraqi Division, and a good way to confirm them.	0	0	0	0	0	1	0	1
2. Recovery of body in Iraq from an ambush.	0	1	0	0	0	1	0	2
3. MASINT, SIGINT, and satellite imagery indicated unusual movement at unusual hours in my company AO in Al Anbar in 2005. We acted on the intel, and as a result unearthed over 3000 artillery shells and buried milvans full of other enemy ammunition.	0	1	0	0	0	1	1	3
4. My unit utilized ARCGIS to track progress of Iraqi Police development and expansion by station, district, directorate and province. We used Geospatial products depicting cultural data by area in order to help determine which areas Shia versus Sunni IPs would be most effective and to gain insight into issues IP trainees would have as they traveled to and from IP training facilities (ex.Shia trainee traveling through Sunni neighborhoods). We also used satellite imagery during planning for the erection and operation of dislocated civilian holding areas during combat operations.	1	1	1	0	0	1	0	4
5. Loved and used Buckeye imagery regularly.	0	0	0	1	0	0	0	1
6. GEOINT was the critical factor in destroying the target and conducting the raid that my unit executed.	1	1	0	0	0	1	0	3

7. We ran daily convoy security missions in Iraq and extensively used imagery (TIGR was a super program) to conduct map recons since we often did not have time for route recons. Color imagery had real value added. We also used imagery from TIGR in our TOC as well as other imagery sources (cannot name them now) to integrate into our TOC and for use with our FBCB2 to monitor and assist convoy commanders with navigation.	0	1	0	0	0	1	0	2
8. In Afghanistan a report from the HN government stated that a bridge collapsed on the ring road. No U.S. forces were able to independently verify and coalition partners would not do a recon to validate. I searched an imagery database for likely bridges based on the report and my office then coordinated for real time imagery shots of the selected sites. We found the collapsed bridge and some signs of why it collapsed and we then directed a U.S. unit to go to the site and conduct a bridge recon.	1	1	0	0	1	1	1	5
9. As a naval officer, we only requested information when close to hostile nations. Receiving key data prior to entering engagement zones was critical to our effective planning and deployment to maximize our capabilities.	1	1	0	0	1	1	1	5
10. GEOINT was very useful on my last deployment.	1	1	1	1	1	1	1	7
SALIENT TOTAL	5	8	2	2	3	9	4	33
	Operations	Planning	Releasability	Emerging Technology	Maintenance	Shared Awareness	Enhance SA	TOTAL

## APPENDIX E

### QUANTIFIED: FRUSTRATING SURVEY COMMENTS

GENERAL COMMENTS	Operations	Planning	Releasability	Emerging Technology	Maintenance	Shared Awareness	Enhance SA	TOTAL
1. Prepping for elections in Iraq - most of the work done on SIPR but everyone working elections did not have SIPR access. The Iraqis knew all about their elections, but the data and products produced was not immediately available due to work being executed on SIPR.	0	1	1	0	0	1	0	3
2. Trying to get NGA to grant release authority so we could share a product with our Iraqi partners when NGA was the originator. They said we should get release authority from in theater; we were redirected back to the originator!	0	0	1	0	0	0	0	1
3. Many geospatial products were restricted access/LIMDIS and not very user friendly, especially when denying access to over half our coalition. It was not user friendly nor were the enabling abilities explained well or integrated	0	0	1	0	0	0	0	1
4. Main problem working at MNC-I as a collection manager was the challenge of not having a cradle to grave ability for units at battalion/brigade level to easily submit requirements for collection. Use of spreadsheets was the only means to gather requirements for input to PRISM for USAF collection and to Army Assets for collection.	1	1	0	1	0	1	0	4
5. Second, was the lack and refusal of USAF leadership at the CAOC to push U-2 imagery to Corps TES.	0	0	1	0	0	0	0	1
6. I was not always sure of the product I needed, especially with limited time and resources	0	1	0	0	0	0	0	1

7. GEOINT was not directly integrated into the G5 section. Therefore, long range planners did not properly frame the problem with GEOINT tools to show the human and urban terrain along with the physical and geologic terrain.	1	1	0	0	0	0	0	2
8. I never really understood how it worked, and what the system can provide. It was never touched on in any training I received, but all learning by experience.	0	0	0	1	0	0	0	1
9. Accessibility and proactiveness.	1	0	1	0	0	0	0	2
10. As a member of a MiTT, we were not supplied with a GEOINT TM and we did not have the expertise to perform those tasks.	1	0	0	0	0	0	0	1
11. I didn't have much training before deploying, and I still don't really know what all is available and how to get it.	1	1	0	1	0	0	0	3
12. More importantly, MN partners were not able to access anything except what I gave them in hardcopy, since they weren't cleared for most of it.	1	0	1	0	0	0	0	2
13. Compatibility, especially with CPOF !!!	0	0	0	0	0	0	1	1
14. Need to update imagery within CPOF at CGSC and on BFTs and FBCB2s.	0	0	0	0	0	0	1	1
15. At the Infantry BN tactical level - getting my hands on the products that are available is the most frustrating part. I know that these products exist, but don't seem to rate a priority high enough to get the information (existing information) or understand what channels I need to work through to get new information. i.e. an updated analysis of my AO.	1	1	0	1	0	1	0	4
16. Constraints of exploitation. Often this would be the means to restrict collection from theater assets. It was always the position of MNC-I to collect on imagery and not limit the collection because of exploitation. Reason, weather and maintenance would prevent some flights and analyst could catch up on exploiting imagery during those times.	0	1	1	0	0	0	0	2
17. I am taking a couple of geospatial courses in ILE now as electives. I wish I new last year in Iraq what I know today. I would have been much more effective as a BN S3.	1	0	0	0	0	0	0	1

18. Too much secrecy surrounding data that did not need to be classified. Too much data on classified systems that could not, or was not, migrated to unclassified systems.	0	0	1	0	0	0	0	1
19. Trying to find someone that could inform us of what was available and how we could get it.	1	1	0	0	0	0	0	2
20. There is a lot they can provide, but not everyone understands their capabilities... and they do not “sell” themselves very well.	1	1	0	1	0	1	1	5
21. None.	0	0	0	0	0	0	0	0
22. Tools come fast and it is difficult to retain experts in the unit. There are many systems available but finding those assets, or experts, is difficult.	1	1	0	1	0	0	0	3
23. The time delay to receive information was frustrating, but I realized that we were not high on the priority list. Learning to foresee future needs was our work-around, which was an effective method of teaching the staff.	1	1	0	0	0	0	0	2
24. Not having automated fusion of GEOINT with other INTs/systems.	1	1	0	1	1	1	1	6
25. Lack of connectivity between interagency, international, and interservice exploitation and reporting systems.	1	1	1	1	1	1	1	7
26. Convincing the intelligence officers to divert assets to look at the sites even though it was declared a priority by the chain of command.	1	1	0	0	0	0	0	2
FRUSTATION TOTAL	15	14	9	8	2	6	5	59
	Operations	Planning	Releasability	Emerging Technology	Maintenance	Shared Awareness	Enhance SA	TOTAL

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